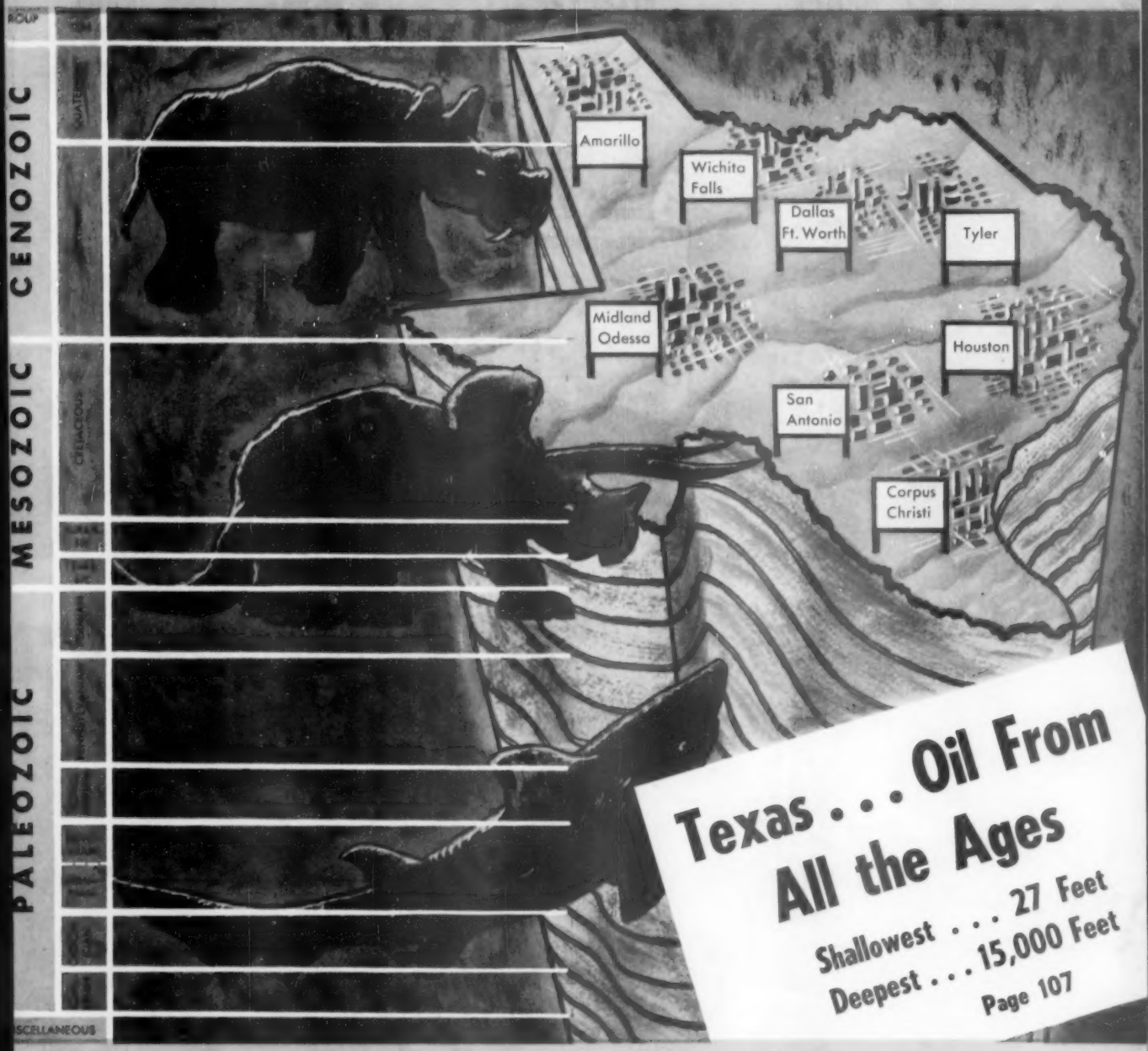
FEBRUARY 21, 1955

the OIL AND GAS JOURNAL



Texas . . . Oil From All the Ages

Shallowest . . . 27 Feet
Deepest . . . 15,000 Feet

Page 107

. . . with "County Correlator for Texas Oil"—an insert color map.

- **Things Look Good North of the Red River—unless . . . 80**
- **Texas Railroad Commission Wielding a Busy Broom . 82**

UNIT RIG'S
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is an integral part of the draw works . . . .
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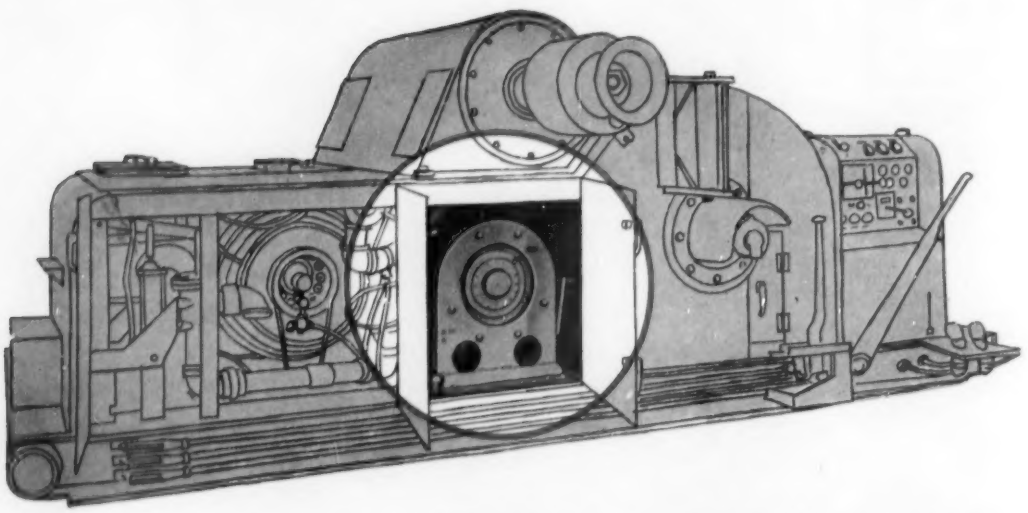

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PAGE 1 ONE . . . *a glance ahead*

Premium gasoline use is up sharply, already accounts for nearly half of gallonage used by passenger cars (not counting farm and commercial gasoline uses). Trend will continue with output of new cars with higher compression ratios, causing refiners to base plant programs on boosting premium capacity.

Sensational devices to detect corrosion damage in long pipelines while in use are being worked on by at least two pipeline companies. Inspecting device would reveal internal corrosion spots, indicate whether to fight corrosion, lower pressures, or replace sections.

Astonishing increase in U. S. crude-producing capacity during last couple of years will be shown in forthcoming NPC report. Preliminary figures indicate we could produce 2,000,000 bbl. per day more than the 1954 average actual output.

Chances of producers getting import relief from the Senate are not bright. Quick handling of administration bill in House shows it has backing of leaders of both parties. Now that Eisenhower has come out against quotas, best hope of producers is Senate approval of more effective escape or peril-point provision.

Most exciting development in oil-field operations this year will be progress in automation. Experiments range from fully automatic robot instrumentation to improvised gadgets for turning distant valves. Payoff will be reduction in rising cost of field manpower.

Size of Shell-Murphy crude line from eastern Montana (14, 16-in.) indicates that backers plan eventually to take crude from other parts of Williston basin, such as North Dakota or Saskatchewan.

Venezuelan Government is acting coy on new concessions. Hasn't acted on offers invited last October but is now suggesting to companies that they might also bid on other areas they passed up as less attractive.

Offshore allowables will be a sore point if production there gets big while there is still general surplus of crude. The trend toward setting allowables on depth and cost factors foreshadows big quotas for offshore wells while onshore are curtailed.

the OIL AND GAS JOURNAL

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OIL AND GAS PIPELINES • REFINING • PETROCHEMICALS

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TECHNOLOGY—OPERATION

Texas Oil 107

By Frank J. Gardner

Texas is the only state to find oil production from every part of the geologic column. First oil came from Tertiary sand lenses at depth of 60 ft. Today on the opposite side of the state Cambrian and Ellenburger are providing flush production. It is estimated that 97.7 billion barrels of crude oil was discovered in the state prior to 1955. Of this 17.8 billion has been produced, and Texas can count on recovering only about one-third of the discovered oil by conventional recovery methods.

T.P.R.C. Reports Texas Reserves . . . 115

By G. H. Fancher, R. L. Whiting, and J. H. Cretsinger

Figures by the Texas Petroleum Research Committee show a breakdown of oil produced from the various geologic ages. However, reserves for Districts 7-B, 9, and 10 are not divided by formations. A complete breakdown on original oil in place; original primary reserves; accumulative production as of January 1, 1952; primary reserves as of January 1, 1952; and secondary reserves as of January 1, 1952, are given by districts.

County Correlator for Texas Oil . . . Insert

This useful insert map shows the areal distribution of the producing zones of Texas, ranging from the Cambrian to the Recent. The stratigraphic chart lists the producing zones and the counties where each zone produces; in addition, typical fields are listed for each county.

Exhaust Gas for Fast Drilling 119

By Charles B. Erbe

Carter Oil Co. drilled an Arkansas wildcat with rig exhaust and reached these conclusions: (1) bit life increased and penetration rates rose as compared to mud drilling for this application; (2) volume of exhaust gas from the rig was adequate; (3) successful operation depended on keeping the hole dry.

Hydrofining Naphthas 122

By Donald L. Baeder and Charles W. Siegmund

Hydrofining is a natural for naphthas. Some of its advantages are: (1) major product quality improvement; (2) upgrading of poor quality stocks previously considered unattractive for processing; (3) no rerunning of finished products; (4) no waste disposal problem, and (5) continuous operation.

Gas Turbines for Pipelines 128

By T. R. Rhea

The gas turbine is not at a disadvantage with the conventional reciprocating engine if the prime movers are evaluated by a new method. When over-all station fuel efficiency per unit of gas pumped is determined, very little difference between the two is noticed. This procedure gives a better indication of over-all station performance than does the conventional method of comparing driver efficiencies.

On-The-Job: In the Plants 132

By F. Lawrence Resen

Several short cuts are utilized in equipment maintenance at Magnolia's Seeligson cycling plant. Among these are use of modified tools for working on piston rings, valve seats, and piston clamps. A hoist frame facilitates handling large equipment. Also a new idea for testing relief valves, and a heater for constant temperature flow measurement.

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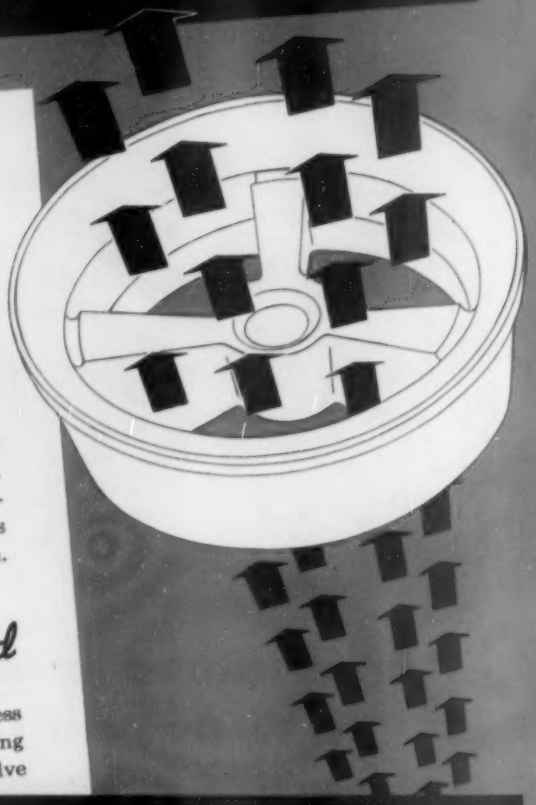

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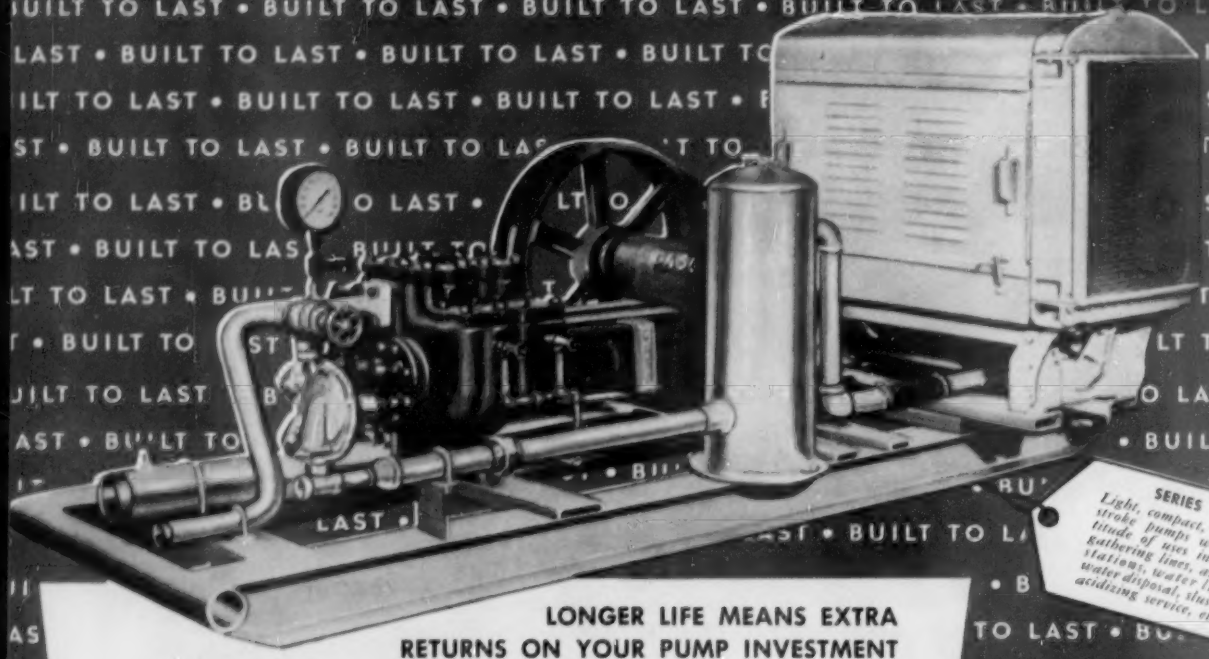

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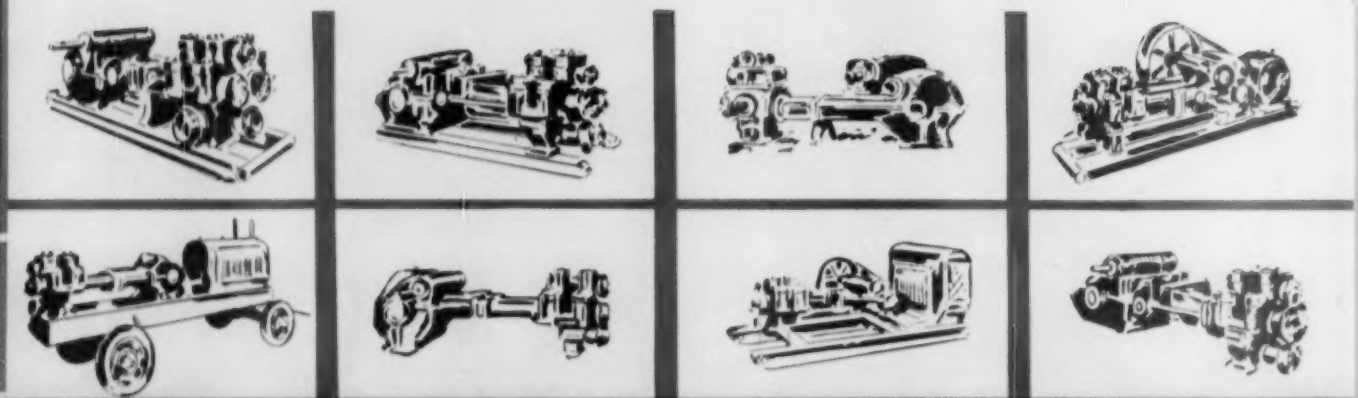

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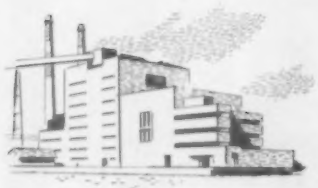
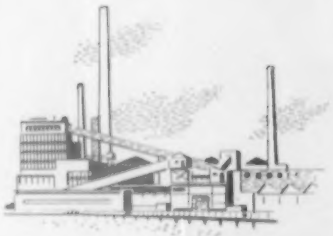
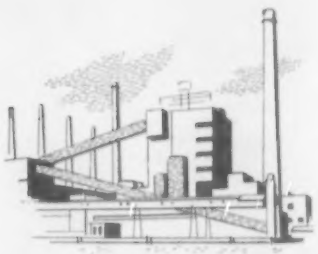


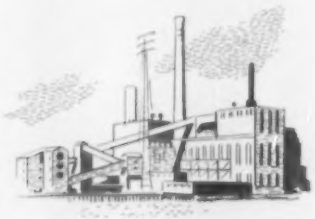
Salem Harbor Station in Salem, Mass.
Two 60,000 kw. units — '51 & '52



Webster St. Station in Worcester, Mass.
30,000 kw. unit — '50



South Street Station in Providence, R. I.
55,000 kw. topping unit — '53



Manchester St. Station in Providence, R. I.
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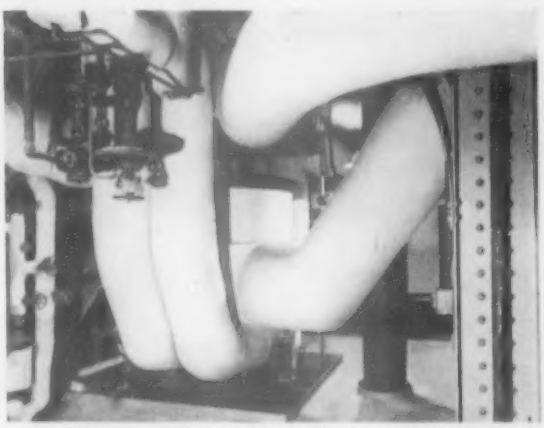

Main steam and reheat lines at reheat intercept valve, Salem Harbor Station.

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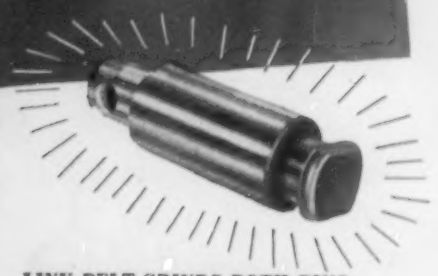

LINK-BELT GRINDS BOTH PINS AND BUSHINGS. Note the polished, satiny surfaces on these alloy steel parts. Grinding the pins and BOTH inside and outside of the bushings to a fine micro-inch finish eliminates wear-producing surface irregularities.

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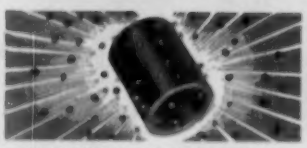
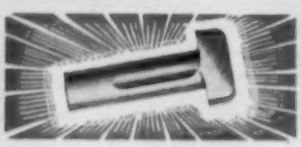


SHOT-PEENED rollers have been hammered by tiny steel balls—creating added ability to withstand shock and impact.



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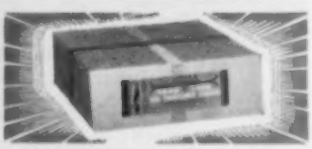

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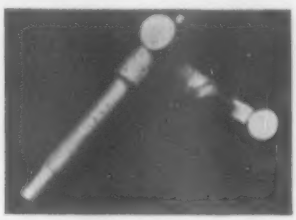

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- Line Freezes Avoided
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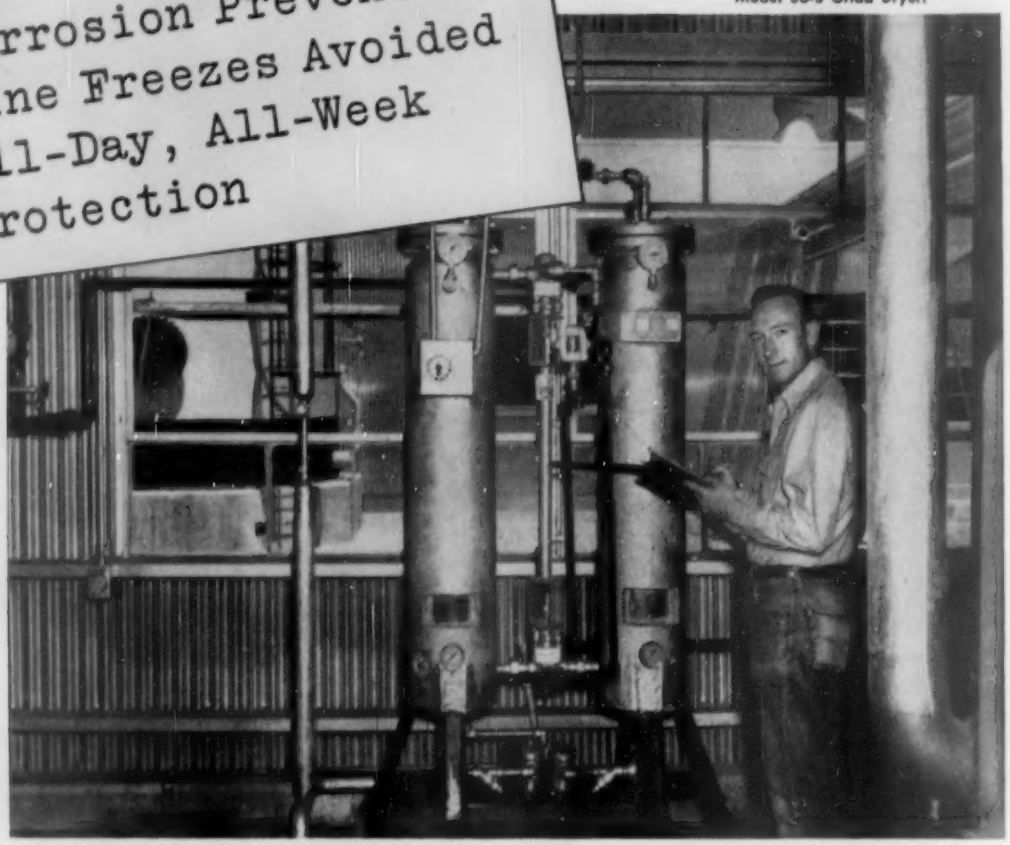


Jerry Rea, plant worker, checks on the trouble-free operation of twin towers comprising Kemp Model 50-S Oriad Dryer.

Sulphur Producer Gets Automatic Drying of Compressed Air with Kemp

During their processing of sulphur and sweetening of natural gas, the Powell, Wyoming, plant of Seaboard Oil Company of Delaware needs large quantities of dried, compressed air to operate complex control instruments.

When their Silvertip Field plant was opened, the operators turned to Kemp to provide this dried air, installing a Model 50-S Kemp Dryer. The machine operates on a manual switching and automatic timing device. Imbedded steam coils reactivate the towers . . . permitting 25 cfm capacity at an exit pressure of 50 psi. The installation is operating 24 hours a day on a seven-day week — preventing corrosion and avoiding costly delays caused by line freezes in the plant.

If drying air or other gases is a problem in your operation, it will pay you to discuss your problems with a Kemp Engineer. He can recommend specific equipment to handle your specific problem . . . and give you the benefits of *every* Kemp installation—simplicity of operation and maintenance, low installation cost and minimum maintenance expense. A Kemp Engineer is ready to discuss your needs—without obligation.

For detailed, technical information, ask for Bulletin No. D-29. Write to:
C. M. KEMP MFG. CO., 405 E. Oliver Street, Baltimore 2, Maryland

KEMP OF BALTIMORE

ADSORPTIVE DRYERS

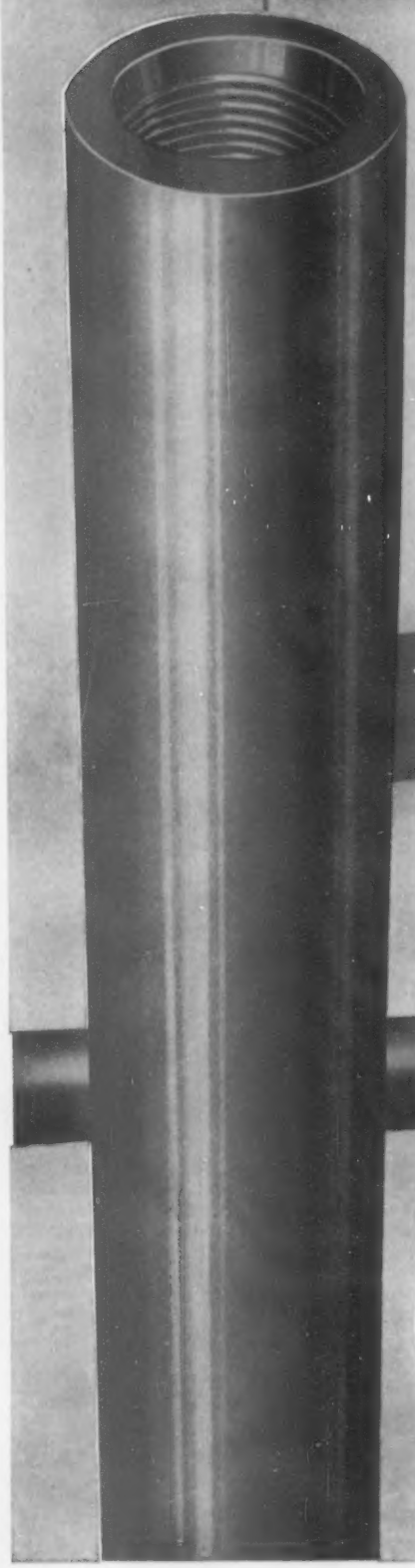
ATMOSPHERE & INERT GAS GENERATORS
SINGEING EQUIPMENT • IMMERSION MELTING POTS
CARBURETORS • BURNERS • FIRE CHECKS

Drilling conditions often differ....but not the

HIGH QUALITY of AMERICAN IRON DRILL COLLARS!

Year after year . . . in every oilfield in the world . . . American Iron drill collars have established an enviable reputation of dependability for **top performance.** But this record is not surprising . . . once the American Iron **controlled** manufacturing processes are fully understood. Exacting conformity to high standards is demanded for each procedure.

You'll find many reasons for the excellence of American Iron drill collars fully explained in our new catalog (available upon request).



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AMERICAN IRON DRILL COLLARS

. . . are available with "Rol-Flex" replaceable ends, a connector which is designed to utilize the outstanding features of the famous American Iron Straight Grip drill pipe tool joint. No other drill collar has all the advantages of "Rol-Flex" replaceable ends.

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MANUFACTURERS OF OIL FIELD EQUIPMENT
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OKLAHOMA CITY U.S.A.
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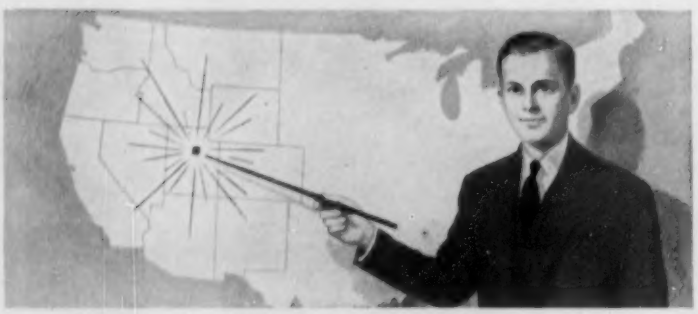
NEW UTAH PLANT to speed low cost delivery of USS quality gas and oil PIPE



Strategically centered to reach you with the greatest possible efficiency, Consolidated Western's new plant will produce and deliver the highest quality electric-welded steel pipe at the lowest possible cost. Sizes available include 4" to 40" diameters to meet the needs of transmission pipelines as well as distribution systems and industrial installations. New long length Consolidated Western pipe is engineered and manufactured to provide (1) uniform circumference and roundness insuring perfect fit-up in the field; (2) uniform diameter and wall thickness coupled with high yield strength and ductility for maximum strength per ton of steel.

Because United States Steel emphasizes quality control from mine to mill to finished steel . . . its consistently high-quality steel pipe is in demand the world over. A major portion of the world's large-diameter welded-steel gas and oil pipe has been produced by the Consolidated Western process. For 100 years, the Consolidated Western Steel Division of United States Steel has pioneered the fabrication, erection and manufacture of pipe, structural steel, plate products and mechanical equipment—constantly proving that only steel can do so many jobs so well.

Consolidated Western Steel Builds New Pipe Plant at Provo, "The Hub of the West"... to Better Serve a Growing, Building West

PIPELINE OVER THE COLORADO. Bridging the Colorado River between Arizona and California, this 1040 foot pipeline is built from high-strength sections of 30" welded-steel pipe manufactured by Consolidated Western. This important link—connecting the El Paso Natural Gas line to the Southern California Gas and Southern Counties Gas systems—is the second largest of its type in the world.

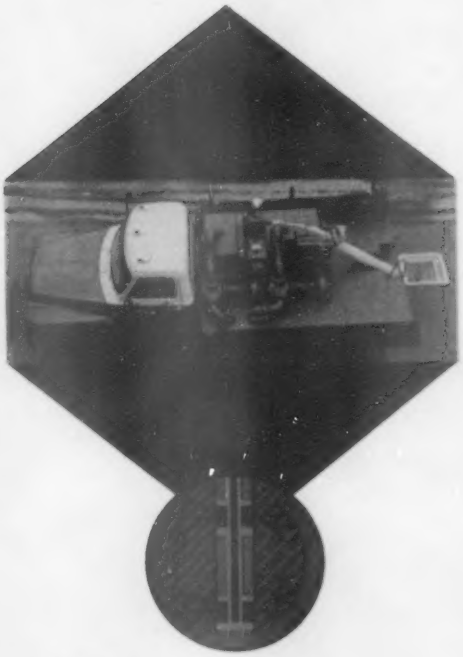
CONSOLIDATED WESTERN STEEL

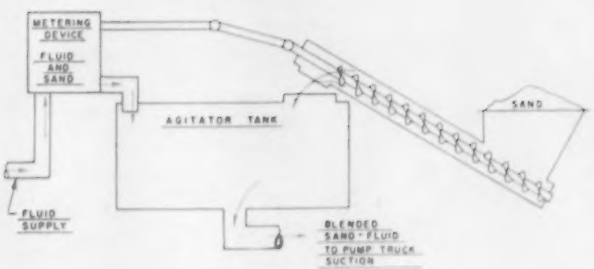
Sales Offices: Los Angeles, San Francisco, Fresno, Bakersfield, California; Phoenix, Arizona; Seattle, Washington; Houston, Texas.

DIVISION

UNITED STATES STEEL

VARIABLE FEED PROPORTIONING EQUIPMENT CONTROLS HYDRAULIC FRACTURING





ANOTHER *FIRST* FOR HALLIBURTON FRACTURING SERVICES

The sand and oil proportioners, another exclusive development by Halliburton, permit individualized treatment for *any* special well conditions and give greater control for *every* fracturing job. Able to provide continuous and variable control of sand and oil ratios during the entire fracturing job, the powerful proportioners can change sand volume from ⅛ pound per gallon to 6 pounds per gallon by the turn of a control.

The largest units for controlling the successful big frac operations will handle as much as 70 barrels of fluid with 6300 pounds of sand every minute. And with heavy duty pumps, as much as 55 tons of sand and 30,000 gallons of fluid have been injected into low pressure formations in just 11 or 12 minutes!

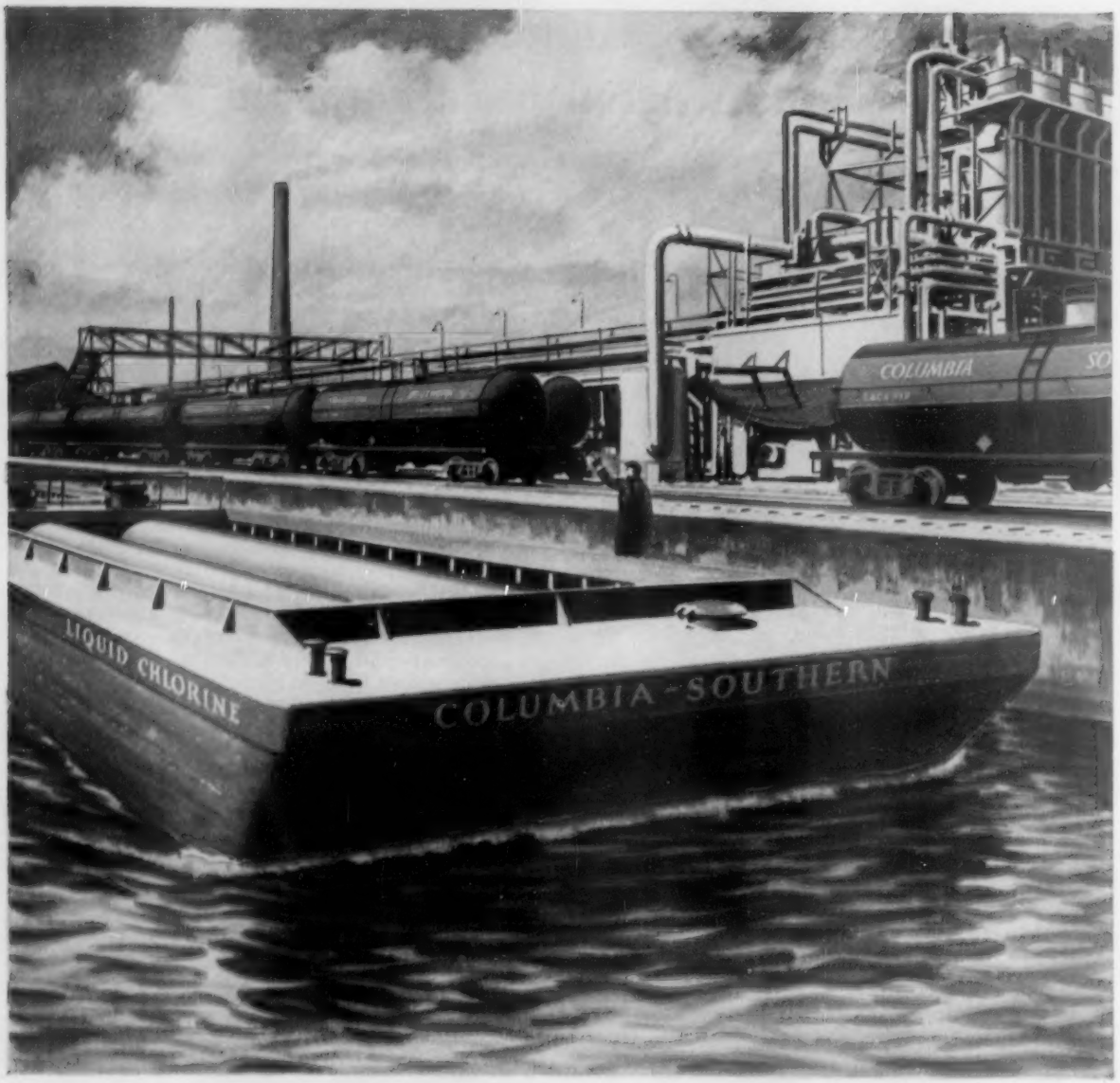
These Halliburton proportioners consist of a metering device to control fluid volume, a proportioning screw to transport specified amounts of sand and a twin screw agitator in a relatively small mixing tank to insure high agitation and thorough blending of all materials. Controls on the equipment allow immediate change of proportion at any time and will strictly maintain this proportion although injection rates may vary over wide ranges.

These proportioners are typical of the Halliburton developments in new fracturing equipment. More powerful pumps, special manifolding systems, continuous or batch type emulsion blendors have all added to the success of Halliburton fracturing. For your fracturing job, call for the special equipment and 50,000 job experience that only Halliburton can offer. Call your local or district office of the Halliburton Oil Well Cementing Company.

HALLIBURTON

FRACTURING SERVICES

211 SERVICE CENTERS—JUST MINUTES AWAY FROM ANY RIG



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Columbia-Southern has complete facilities to render excellent service to chlorine consumers. Our Technical Service, Transportation and Traffic staffs are always ready to serve you.

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"Very good. We stopped in to see the local Hazard distributor and had him show us their ton-mile book. I thought it would be complicated but the way it's laid out we got the idea immediately.

"We bought a line from him and kept track of every tour just the way the log sheets in the Hazard ton-mile book call for, and we follow the cutoff system according to instructions. We've already got more service out of the Hazard LAY-SET Preformed drilling line than out of any others we've used, and the Hazard line looks like it's good for a long time yet."

The days are gone when you could put on a line, run it to death, then get a new one. You'd go broke operating that way today. Get the habit of seeing how many ton-miles you can get from a drilling line... to be specific, a HAZARD LAY-SET Preformed rotary drilling line.

Your nearby HAZARD distributor has a stock of all popular drilling lines and can give you quick service. Let him tell you why they're so good, and let him show you how easy you can put a ton-mile book to work on your rig. You'll save money if you do. See him today.

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PLANTS: Houston, Tex., Wilkes-Barre, Pa.
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DID YOU KNOW...

Rope was used in Egypt nearly 5,000 years ago. Three samples date back to the Third or Fourth Dynasty or possibly 2560 B.C. and indicated an advanced knowledge of manufacturing.

One of the following ropes may be helping you in your day-to-day operations:

Derrick lines
Catlines
Spinning lines
Refinery maintenance rope
Drilling cables and crackers
General-purpose rope

Approximately thirty different grades of Manila fiber are used in making rope. "AMERICAN BRAND" Best Pure Manila Rope by St. Louis Cordage Mills, sold at your near-by J&L store, is made of the finest of these natural fibers, approximately 25% stronger than First Grade Sisal.

Rope from J&L for any purpose comes from production constantly and rigidly checked for tensile strength, and for resistance to abrasion, sun, water, chemicals, heat, fungi, and other rope enemies common to oil country application.

From a relief in the Temple of Edfu, Upper Egypt.

"AMERICAN BRAND" Best Pure Manila Rope — 3-strand.

Dia.	Feet Per Lb.	Minimum Tensile Strength
½"	13.3	2,650
1"	3.71	9,000
1½"	1.67	18,500

Safe working load: 20% of tensile strength. 4-strand rope has approximately same strength as 3-strand, but is 5% to 7% heavier.

Get your copy of MANILA ROPE FOR THE OIL INDUSTRY. It includes "Useful Knots and Specifications."

J&L STEEL

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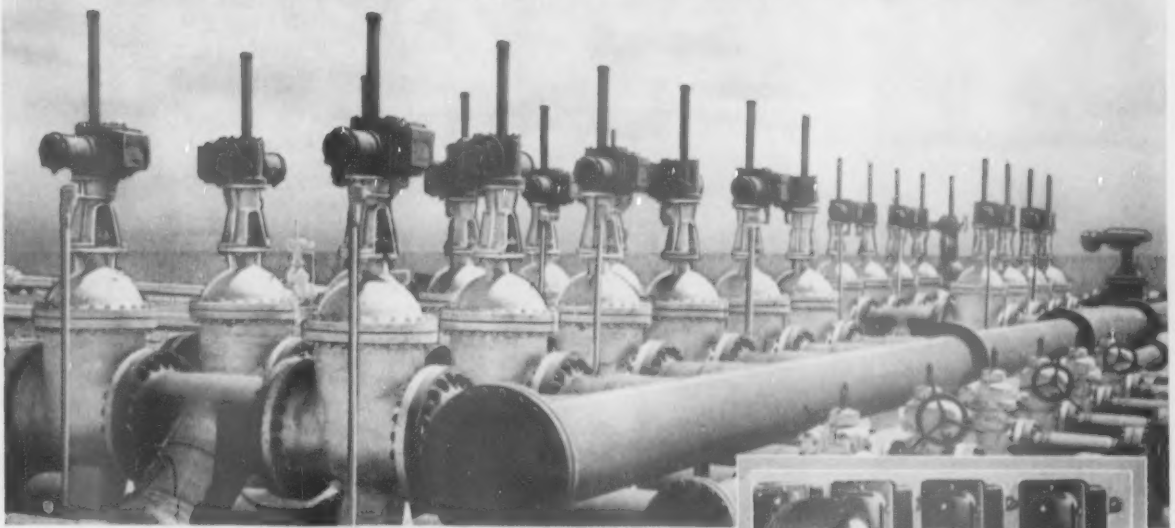
Limitorque®...

on the World's Leading Pipe Lines and in Today's Efficient Refineries



In fact, more LimiTorque Valve Operators are used in major oil and gas pipe lines, than all other makes combined. Their wide spread acceptance is due not only to the fact that they possess every desirable feature, but also because they have proven to be absolutely reliable under all operating conditions.

LimiTorque operates at the mere "push of a button" and thus, saves time, labor, and money required for manual operation of valves at distant or inaccessible locations. Further, LimiTorque opens and closes valves at the exact speed required, and it also "limits the torque" applied to valve operating parts, thereby preventing possible damage to valve stems, seats and discs. And too, the handwheel "cannot rotate" when the valve is being motor operated.

LimiTorque may be actuated by any available power source, such as Electricity, Oil, Gas, Water or Air; and is now available for Microwave control.

You take no chances with LimiTorque, because it has been time-tried and tested under all conditions for many years,—and it has been constantly improved to satisfy the demands of modern industry for the very best in Automatic Valve Operation.

push-button operation

Send for our latest LimiTorque L-54, you'll be convinced.

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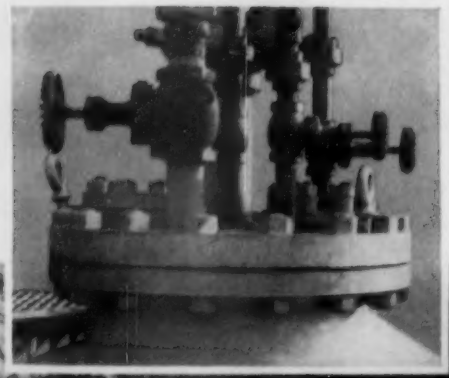
Industrial Gears & Speed Reducers

LimiTorque Valve Controls

Established 1892



Oh, I see

. . . they're using OIC Valves at

PROTANE CORPORATION

"Our men prefer OIC Valves".

L-P Gas service requires perfect valve functioning—no leaks—strength—safety—long-wearing, positive-operating parts. When you want these same qualities in the valves you buy, regardless of service, rely on OIC Valves. Their design is modern, and their performance is proved by the nation's outstanding valve users.

Write for the new OIC L-P Gas Valve Folder, Form No. 1002.

Contact your nearby OIC Distributor for valve requirements.

UNDERWRITER APPROVED

THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

OIC
FOUNDED 1883

VALVES | **FORGED & CAST STEEL, LUBRICATED PLUG, BRONZE & IRON**

PACKAGED COMPRESSOR *SPEEDS* PENETRATION RATES ON TEST WELLS

OIL INDUSTRY TECHNOLOGISTS, investigating methods of reducing present-day drilling costs, recently started a series of tests using aerated mud. Of major importance to this program was the selection of a compressor. The unit had to deliver, automatically, full rated capacity over a wide range of pressures — to operate virtually unattended, leaving the crew free for regular duties. When moving it was essential that only oil field equipment be used and no special foundation required at the drilling site.

A Beaird-Ingersoll-Rand 4-Cycle Packaged Compressor Plant, 220 horsepower 8 JVG, was purchased by Phillips Petroleum Company for this task. Beaird engineers installed automatic controls that permit it to slow down or pick up speed over a range of 50% to 100% according to discharge conditions. A stop valve on the rig floor is all that is required to shut off air instantly for a connection or a trip. Other automatic controls safely handle this sudden change in operation — slowing the engine and unloading the compressor cylinders.

Mounted on its own heavy steel skid base, the compressor is set in a shallow pit near the rig and ballasted with sand or caliche. It moves as a single over-the-road package between drilling sites. On the new location only connections to fuel and mud lines are required to place it into operation.

Let us show you how a Beaird-Ingersoll-Rand packaged compressor plant can be designed to meet your requirements. Sizes 110 h.p. to 660 h.p.

▲ Beaird-Ingersoll-Rand 220 h.p. 8 JVG four-cycle gas engine driven compressor equipped with Young radiator and all necessary equipment and controls on Phillips Petroleum Company's drilling rig.

THE J. B. BEAIRD COMPANY, INC.
Shreveport, Louisiana

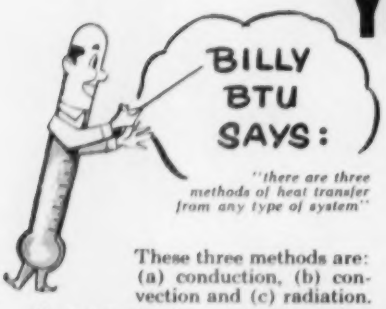
BEAIRD

MACHINING • MANUFACTURING • STEEL WAREHOUSE

Young Heat Transfer News

YOUNG RADIATOR COMPANY, RACINE, WIS.

Utility Cools Compressed Gas with Young Atmospheric Radiators

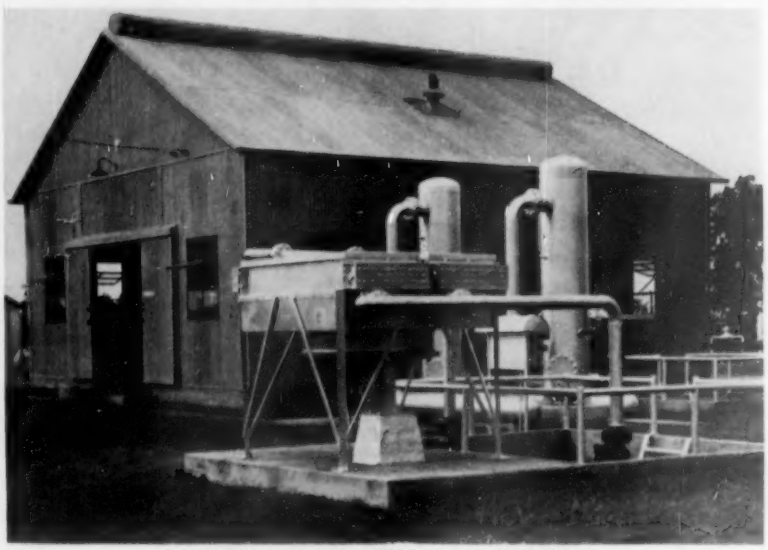


These three methods are: (a) conduction, (b) convection and (c) radiation.

Heat transfer by conduction exists when heat flows within a body from one region of high temperature to another region of lower temperature by simple molecular communication. The amount of heat which can be transferred by conduction is dependent on the temperature difference, thermal conductivity of the material through which the heat is being conducted, the distance between the hot source and the cold sink, and the cross sectional area for heat flow.

Transfer of heat by forced convection depends on the velocity of the fluids over the surface through which heat is conducted . . . by the shape of the surface, by the area through which heat is conducted . . . and by various properties of the fluid as well as temperature difference.

The third general means of heat transfer is radiation. Here heat flows from the body of the higher temperature to the body of the lower temperature through space without any medium within the space. For further details on this subject write for free bulletin: "Heat: Forced Convection Removal From Industrial Hydraulic Circuits" to Young Radiator Company, Dept. 205-B, Racine, Wis.



Young Radiator Company "HC" Cooler and Condenser.

Southwest Natural Gas Company, Ada, Oklahoma, uses Young Radiator Company HC* Horizontal Core Cooler to cool compressed gas stored underground during the summer. Gas is withdrawn during the peak winter loads to supplement pipeline capacity into the City of Ada and nearby points.

Cooling is necessary because higher temperatures are detrimental to the porosity of the formation underground into which the gas is stored.

In addition compressors inside the building are equipped with Young Radiator Company "Mono-Weld" Jacket Water Coolers.

These efficient "HC" Units are also used for cooling water, oil and other gases and for condensing steam and vapors. They combine the efficiency of vertical air discharge with the economy of compact Young design . . . and the versatility of multiple unit combinations. Cooling cores are available in plate fin, Monofin or spiral fin construction for any operating pressure. Fans are mounted independently on special tripods completely eliminating vibration, a major cause of core failure. For full details on "HC" cooling units see your nearest Young representative or write Young Radiator Company, Dept. 205-B, Racine, Wisconsin.

* HC is a Young Radiator Company trademark.

NEW FIXED TUBE BUNDLE HEAT EXCHANGER CATALOG

A complete description of stock and specially engineered Young Radiator Company Type "F" Fixed Tube Bundle Heat Exchangers is given in the newly revised Catalog No. 1234. For your copy, write Dept. 205-B, Young Radiator Company, Racine, Wis.

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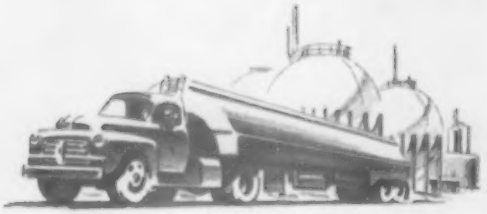
Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY

Heat Transfer Products for Automotive, Aviation and Industrial Applications. Heating, Cooling, Air Conditioning Products for Home and Industry.

Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

EATON 2-SPEED AXLES

Keep Trucks on the Job- Reduce Maintenance Costs



By providing a gear ratio best suited for each road and load condition, Eaton 2-Speed Axles permit engines to work in their most efficient and economical speed range, reducing stress and wear on operating truck parts. Truck maintenance is reduced, trucks deliver more on-the-job hours. In addition, because of Eaton's exclusive planetary design, forced feed lubrication, and extra rugged construction, there's less maintenance on the axle itself. When axle repair is required, Eaton's down-to-earth design makes the work quick, easy, and economical. Trucks with Eaton 2-Speed Axles last longer, earn more at lower cost, are worth more on the trade-in.

Ask your Truck Dealer for Complete Information.

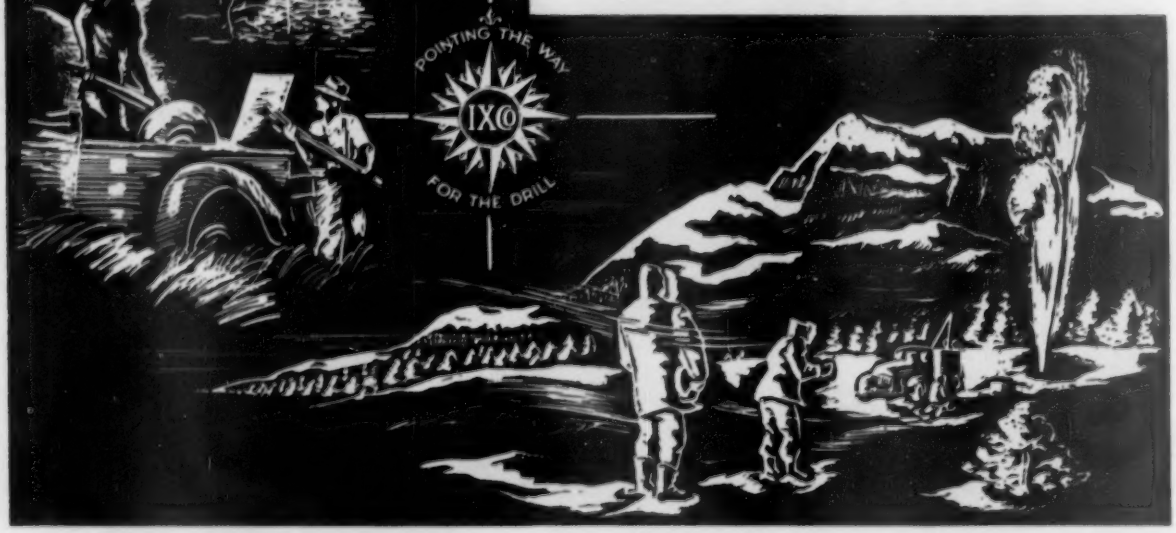
More than Two Million Eaton Axles in Trucks Today!

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

R. T. "Bob" Penny, Supervisor in the Mid-Continent and the Rocky Mountain Areas, is typical of IX executives. Having been with the company since 1939, Bob at one time or another has held practically every field job on an IX seismograph crew.

DERRICKS TODAY
Where I.X. Parties Were Yesterday



All Independent Exploration personnel—from the administrative level to working parties—are intimate with the requirements of a successful geophysical survey. This knowledge of field operations was gained in more than 22 years of intensive field work by men who, though now in executive positions, know the importance of a detailed, accurate survey. These men realize the value of prior planning for a survey and when to use time and cost saving "short cuts." This wealth of IX experience will guarantee you a better return from your survey investment.

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1973 West Gray, Houston, Texas

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How to install the new TUBE-TURN Full-Encirclement Saddle for a "Hot Tap"

1. *Weld branch outlet pipe to run pipe according to normal procedure.*
2. *Position and block up bottom half of full-encirclement saddle.*

3. *Slip top half of full-encirclement saddle over branch outlet. Bring two halves together tightly by means of clamp such as shown.*

4. *Tack weld longitudinal lap plates to top half of saddle, remove clamp and complete welding of plates. (Plates are shop-welded to bottom half).*

5. *Fillet weld saddle outlet to branch pipe.* 6. *Join branch pipe to* TUBE-TURN *Welding Neck Flange. Normal tapping procedure follows.*

NOTE THAT when used with high yield strength, thin-wall pipe, as shown above, circumferential welds between saddle ends and run pipe are not required. This precludes possibility of failure due to underbead cracking or to local stress concentrations which exists at such attachment welds with conventional saddles or other types of "hot tap" fittings which must be fillet welded to high yield strength, thin-wall pipe. The TUBE-TURN Full-Encirclement Saddle fully meets all requirements for reinforcement of welded branch connections as developed by Section 8 of the Code for Pressure Piping.

This new, advanced design is another example of TUBE TURNS' pioneering... why it pays to do business with the leader.

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A Division of National Cylinder Gas Company

DISTRICT OFFICES: New York • Philadelphia • Pittsburgh • Cleveland • Chicago • Denver • Los Angeles
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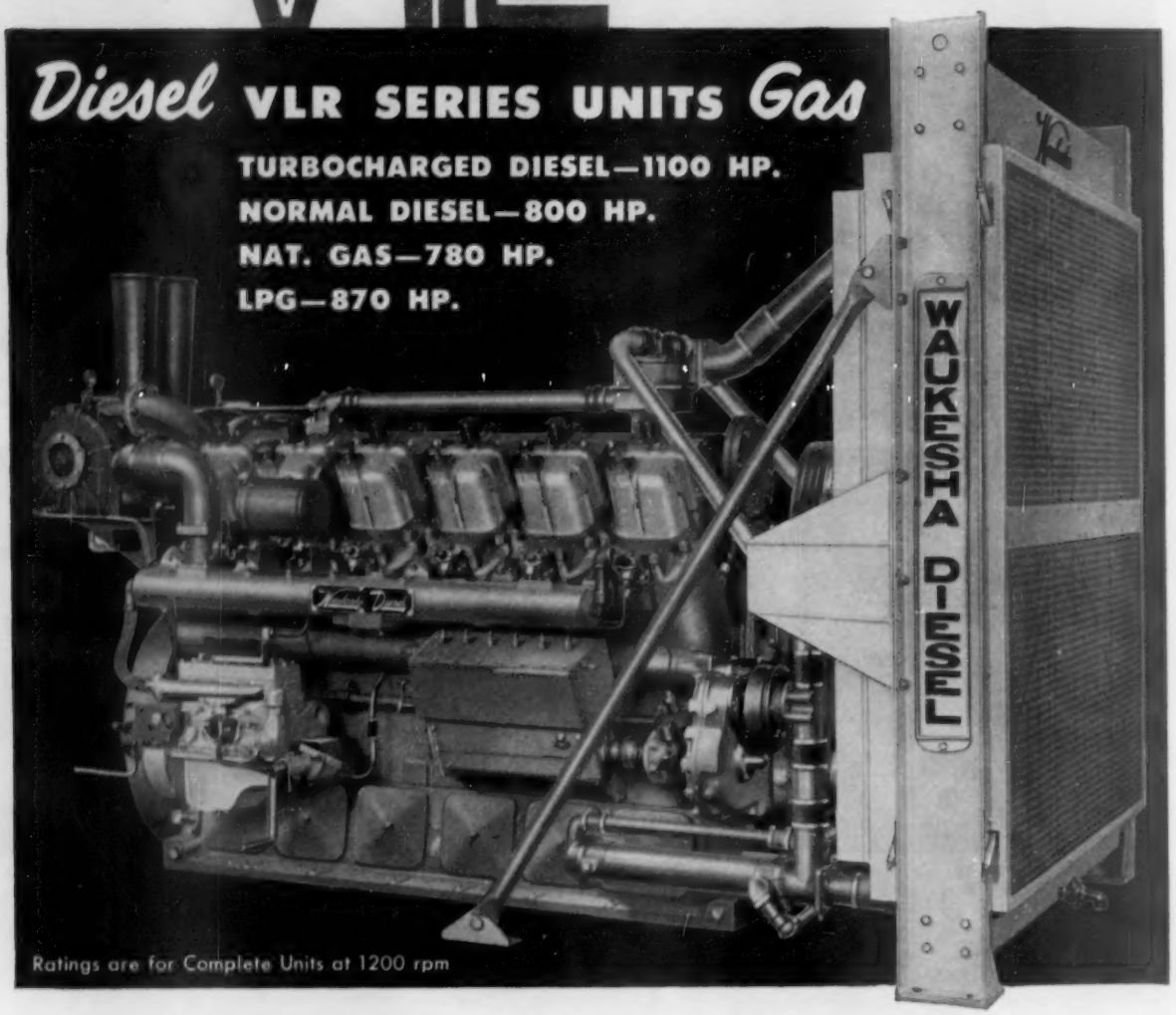
TUBE-TURN

new V-12 WAUKESHA

Diesel VLR SERIES UNITS Gas

TURBOCHARGED DIESEL—1100 HP.
NORMAL DIESEL—800 HP.
NAT. GAS—780 HP.
LPG—870 HP.



Ratings are for Complete Units at 1200 rpm

This powerful turbo-supercharged Waukesha is a twelve-cylinder, 60-degree vee, even firing, four-cycle, solid injection, overhead valve, compression ignition Diesel, of 8½-inch bore and stroke and 5788 cubic inch displacement. The connecting rod arrangement is of the side-by-side type; opposing pistons operating from a single wide-area crankpin.

The turbocharged Diesel unit shown above develops approximately 1100 hp at 1200 rpm with radiator, fan, and air cleaners. Without turbocharging, the normal Diesel complete unit maximum rating is 800 hp. The propane-butane model of this V-12 series develops 870 hp. Bare engine ratings of all models are higher. Response to throttle and load requirements is quick and smooth, with a fast surge of reserve power for emergency and overload demands.

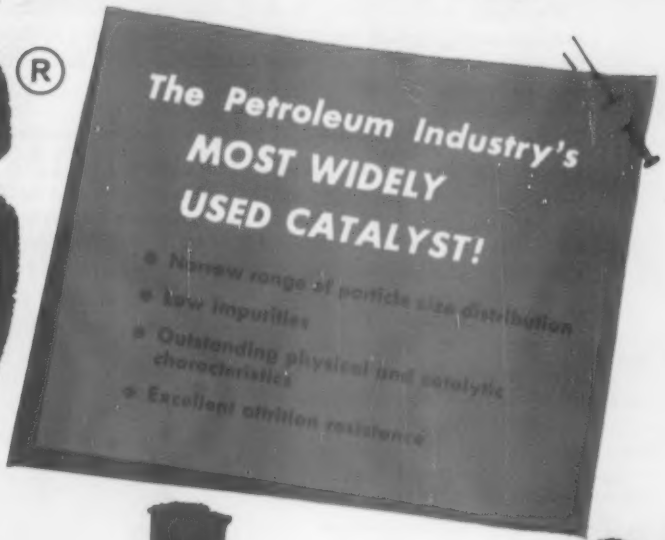
Tremendously powerful, remarkably rugged, this V-12 engine is designed for simplicity and reliability. Major parts are interchangeable between right and left cylinder banks. Main and rod bearings are easily accessible. Strength, precision and balance are built into all elements of the power train, from pistons to flywheel. Supporting members are designed for extreme rigidity and perfect alignment of moving parts.

Send for illustrated Bulletins 1663 (turbocharged)—1664 (normal Diesel)—1656 (gas).

270

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN • NEW YORK • TULSA • LOS ANGELES

DAVISON M-S® Catalyst



These are some of the reasons why Davison's Catalysts are the most widely used synthetic cracking catalysts in the petroleum industry. Throughout the world, Davison's catalysts crack more gas oil than any other catalyst.

Write today for a folder giving all the facts on Davison's M-S Catalysts . . . particle size distribution, chemical, physical and catalytic properties, etc.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY
Division of W. R. Grace & Co.
Baltimore 3, Maryland
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Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels and Silicofluorides. Sole Producers of DAVCO® Granulated Fertilizers.

"Trioflex is just what we need"

says Mayhew Machine & Supply Co.,
leading manufacturer of portable drilling rigs.

"We chose Trioflex Slim Hole Rotary Hose because it combines unusual strength with the light weight so necessary to portable units for work overs and geophysical exploration. Its flexibility makes it easy to handle."

Trioflex is dependable. Look at these outstanding features:

- Synthetic rubber tube resists oil and abrasion
- Braided steel wire reinforcement adds strength and flexibility
- Tough, specially compounded cover provides long life
- Pressed-on couplings anchored securely for life of hose
- Every length pre-tested to 2000 psi.

Furnished in these sizes:
2"—with 2" male couplings, API threads
2½"—with 2½" male couplings, API threads
3"—with 3" male couplings, API threads

Get Trioflex from your supply house, or the nearest Thermoid Warehouse.

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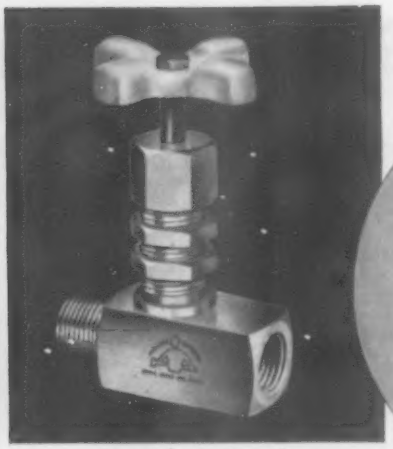
Thermoflex Rotary Hose • Trioflex Slim-Hole Rotary Hose
Mud-Flo Slush Pump Hose • Flexible Discharge Units
V-Belts and Multiple V-Belts • Oil Country Flat Belting

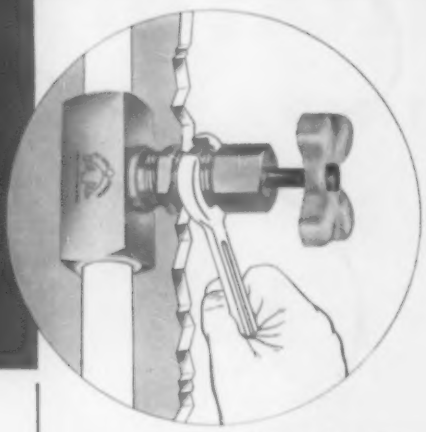
Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

For panel mounting with double female connections.



For panel mounting with male inlet; female outlet.



A quick, trim panel mounting with a twist of a wrench.

Panel mounted in seconds!

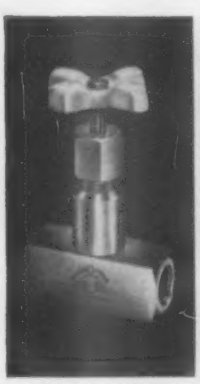
Did you know that the best needle valve is also best for panel mounting?

Look at the valves above . . . specifically designed for panel mounting. No holding fixtures are needed. Simply remove the packing nut and one of the holding nuts; slip the stem through the panel opening and reassemble. The valve handle is packed separately to speed up the job — literally done in seconds.

You get a neater installation at lower cost . . . just one more proof that we have thought of everything in the Marsh 1900 series. Note the unduplicated features opposite. Ask for Needle Valve Catalog covering all details.

MARSH INSTRUMENT CO., *Sales affiliate of Jas. P. Marsh Corporation*
Dept. L, Skokie, Ill.
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas

MARSH *Needle Valves*



Standard globe pattern with double female connections.

Standard globe pattern with male inlet, female outlet.

Standard angle pattern with double female connections.

Standard angle pattern with male inlet; female outlet.

MARSH

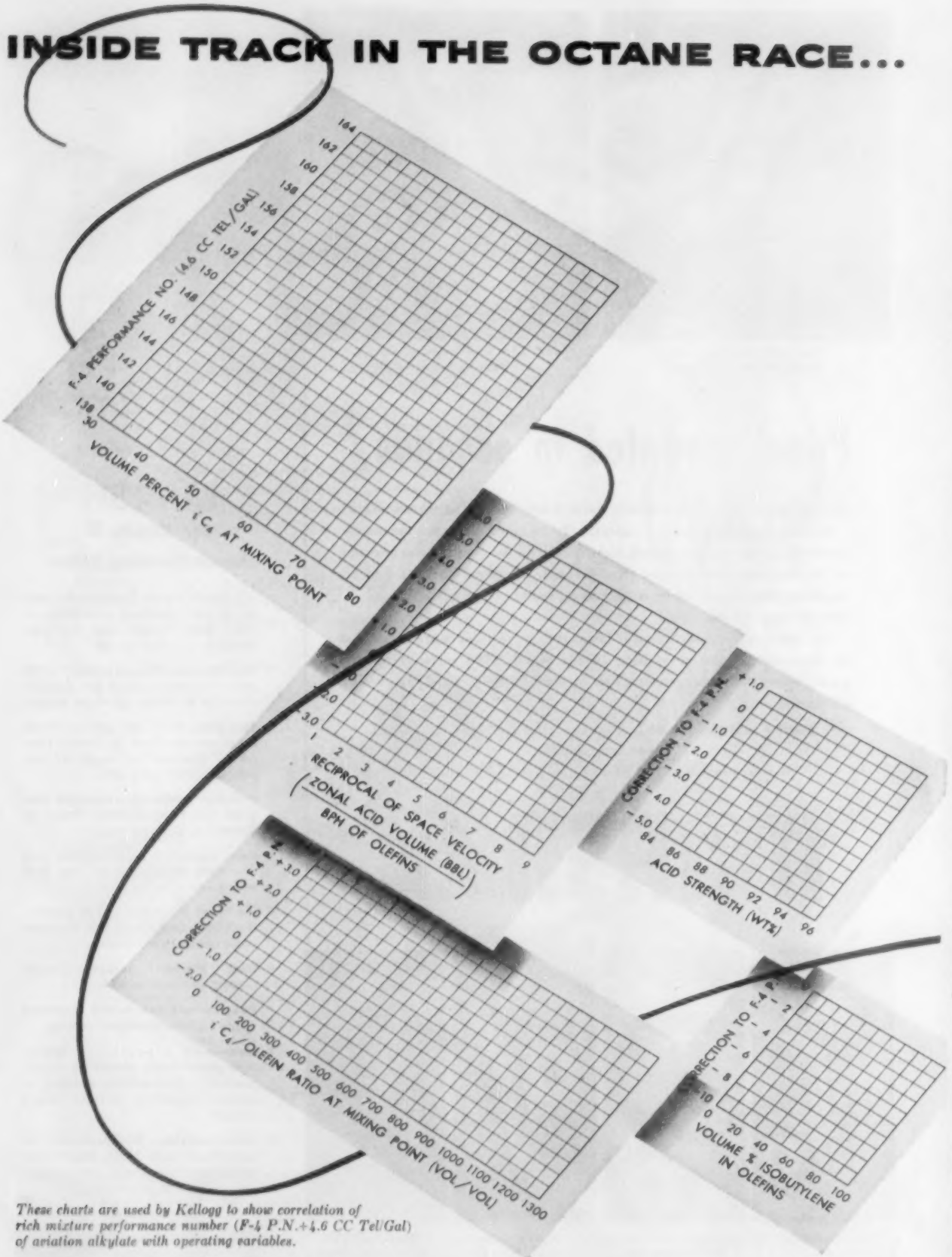
The ultimate in Needle Throttling Valves

All Marsh Needle Valves—for both panel and standard mounting — share these features that are combined in no other valves.

- **Maximum working pressure: 10,000 psi** — for water, oil, or gas. Equally effective in lower pressure ranges.
- **One piece.** Body and stem-guide are fused into one piece by Marsh "Conoweld" process. No danger of stem leaking or blowing out.
- **Precision machined and ground stem** —of 416 stainless steel. Easier to operate at higher pressures.
- **Finer regulation**—provided by long fine stem threads which also give added strength.
- **Machined from heavy bar stock**— Both body and stem-guide. Sturdiest basic construction known.
- **Deep "Marpak" packing**—longer lasting; easier to renew.
- **Deep throats and thread chambers** —for tight make-up of piping.
- **Handsome appearance**—Electro zinc plated body, set off by sturdy malleable iron handle finished in heavy, attractive, yellow baked enamel.
- **Clear markings.** Bodies marked in accordance with M.S.S. regulations showing size, material, service symbol, maximum pressure.

The standard series is shown opposite.

INSIDE TRACK IN THE OCTANE RACE...


F-4 PERFORMANCE NO. (4.6 CC TEL/GAL)
VOLUME PERCENT i C_4 AT MIXING POINT
RECIPROCAL OF SPACE VELOCITY
(ZONAL ACID VOLUME (BBL) / BPH OF OLEFINS)
CORRECTION TO F-4 P.N.
ACID STRENGTH (WT%)
i C_4/OLEFIN RATIO AT MIXING POINT (VOL/VOL)
VOLUME % ISOBUTYLENE IN OLEFINS

These charts are used by Kellogg to show correlation of rich mixture performance number (F-4 P.N.+4.6 CC Tel/Gal) of aviation alkylate with operating variables.

Kellogg Alkylation

-INVESTMENT PAYOUT IN ONE YEAR!

A quick way to higher octane ratings at lowest operating and investment costs is sulfuric acid alkylation—utilizing Kellogg's unique cascade reactor and auto-refrigeration system.

Providing exceptionally high yields of superior alkylate, this Kellogg process sharply reduces the cost of the isobutane recycling equipment; maintains acid consumption at the lowest possible level; assures efficient mixing in reaction sections at low horsepower.

The accompanying co-ordinates demonstrate a few of the variables confronting the alkylate process engineer. The curves of these co-ordinates have been worked out through Kellogg research and experience, and the design results are available to refiners planning new alkylate capacity.

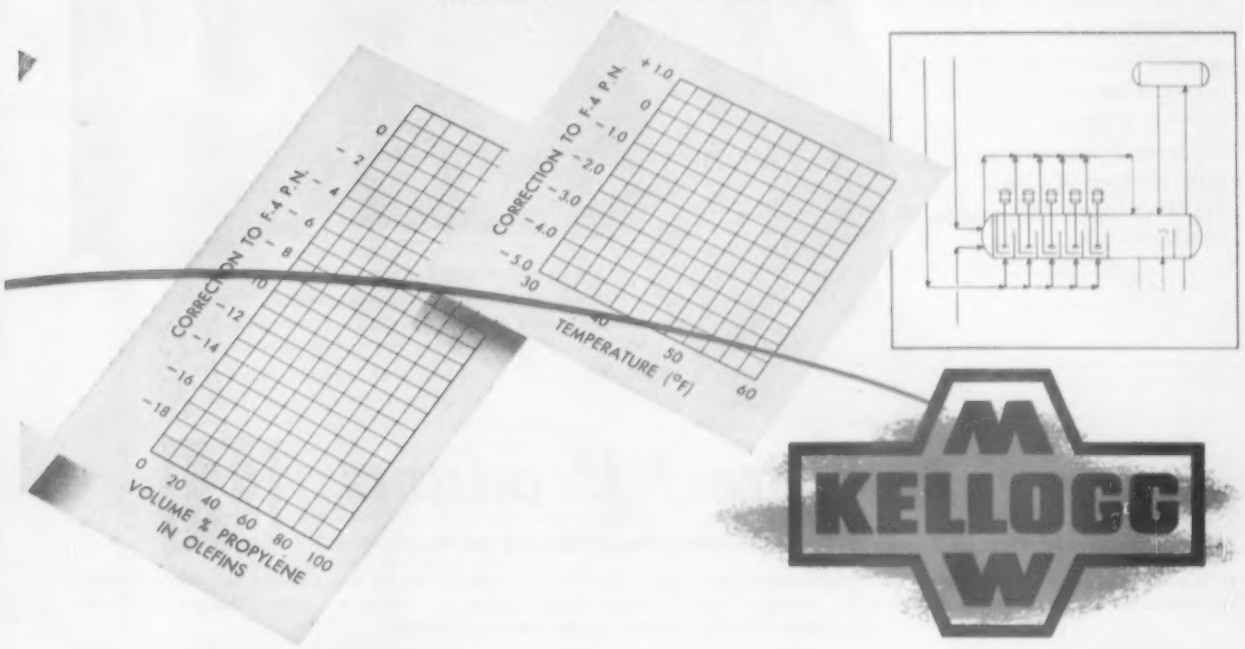
An example of what Kellogg alkylation can do in attaining premium results working with various blending components is provided by a recent study undertaken by Kellogg engineers of a proposed new 25,000 BPSD refinery on the Gulf Coast. Here, alkylation of total C_3 and C_4 olefins, assuming extraneous isobutane available at nominal price, results in the production of 15 volume percent on crude of high octane alkylate, with a payout on incremental investment over a base case of well under one year.

A comparable study of incremental alkylation not requiring extraneous isobutane, but compared with a base case incorporating non-selective catalytic polymerization, shows a payout of just over a year. Under these conditions alkylate production amounts to 6 volume percent on crude, and the combined alkylate plus catalytic polymer to slightly over 9 volume percent.

REFINERY PROCESS DIVISION, THE M. W. KELLOGG COMPANY, 225 BROADWAY, NEW YORK 7, N. Y.

In Canada: The Canadian Kellogg Company, Limited, Toronto. In Europe: Kellogg International Corporation, London

SUBSIDIARIES OF PULLMAN INCORPORATED

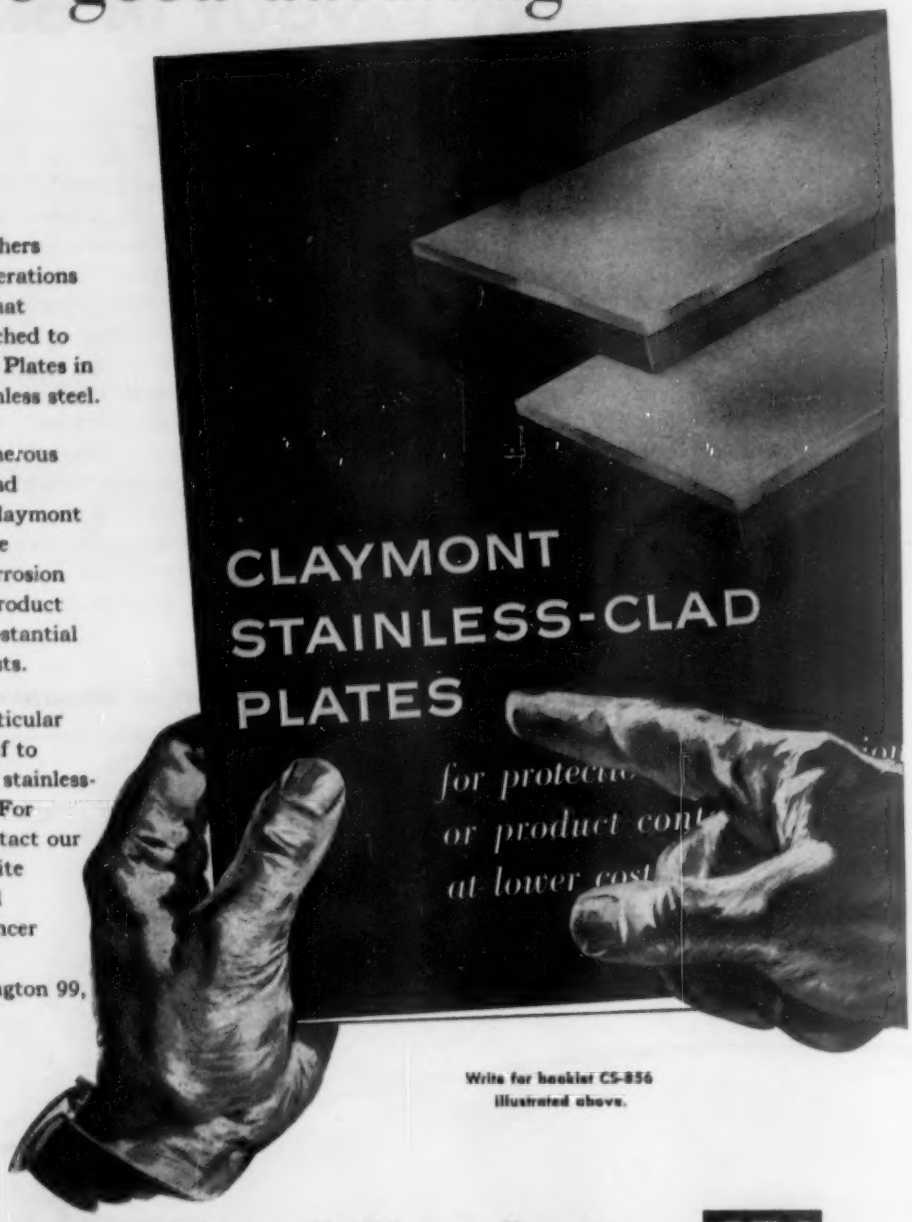


can I use Claymont Stainless-Clad to good advantage?

Many companies in the chemical industry and others engaged in processing operations have asked themselves that question—and then switched to Claymont Stainless-Clad Plates in place of costly solid stainless steel.

They found that for numerous types of tanks, vessels and processing equipment, Claymont Stainless-Clad Plates give effective resistance to corrosion and protection against product contamination—plus substantial savings in equipment costs.

It may be that your particular processing job lends itself to the use of money-saving stainless-clad. Why not find out. For detailed information contact our nearest sales office or write direct to Claymont Steel Products, Wickwire Spencer Steel Division of CF&I, 813 West Street, Wilmington 99, Delaware.



Write for booklet CS-856 illustrated above.

Claymont Steel Products

CF&I

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

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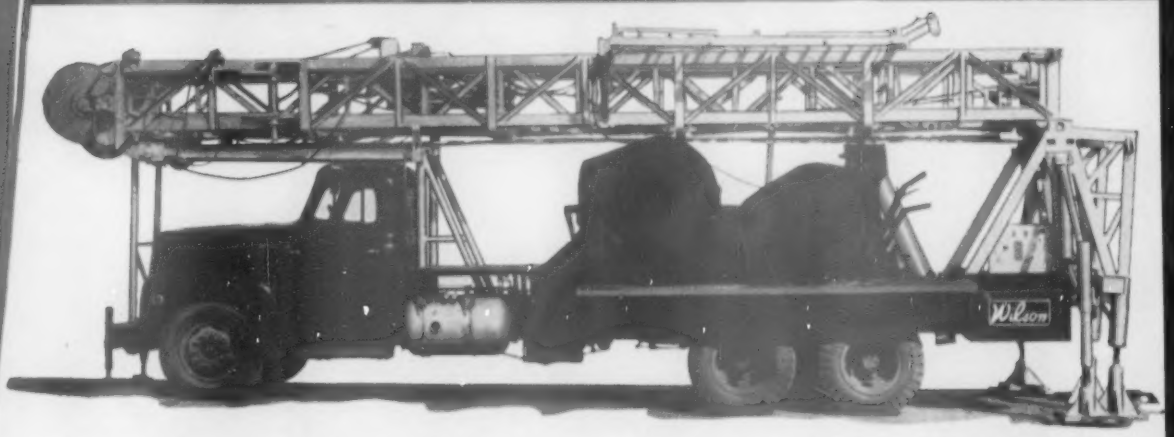
Carbon and Alloy Steel Plates • Flanged and Dished Heads • Manhole Fittings and Covers
Large Diameter Welded Steel Pipe • Flame Cut Steel Plate Shapes

2842

When it comes to OIL WELL SERVICING—

"RED IRON" ELIMINATES RED INK

BE MODERN-BUY WILSON!



Super "38" Double Drum Winch—Power Take-off mounted—with Super 65 foot Mast

THE *NEW* WILSON HEAVY DUTY TRUCK POWER TAKE-OFF

Designed especially for use on large trucks to carry full engine power to Oil Well Servicing Winches, *this "PTO' is the finest of its kind.*

Mounted directly in the drive shaft system of the truck, it turns the drive at a right angle and reduces the speed by one half, in a spiral bevel gear drive that is perfectly noiseless. A multiple width roller chain drive then transmits the power upward to a point above the truck frame. Here an extension drive shaft, equipped with gear-type clutch, carries the power outward to an oil bath chain drive which then carries the power to the winch countershaft. A gear clutch is provided in the main drive shaft to disengage the truck wheels when desired. All parts are enclosed and run in oil bath.

All drive system parts are extra heavy, heat-treated alloy steel, and run on extra large precision anti-friciton bearings. The case is welded heavy plate steel with a three-point suspension in the truck frame. This Heavy Duty PTO weighs about 1200 pounds complete but will save several thousand pounds of extra engine and transmission weight. It also makes possible a complete well servicing unit within legal weights, that would not be possible with separate engine and transmission or converter.

SPECIFICATIONS FOR SUPER "38" WILSON WINCH

	Main Drum	Sand Line Drum
Drum Barrel Dia. & Length	12¾" x 35"	12¾" x 35"
Brake Ring Dia. & Width	38" x 8"	31" x 8"
Flange Diameter	43"	37"
Spooling Capacity 9/16" Line	13,000'	10,000'
Number of Speeds	5	5
High Speed 1st layer	1000	1800
Low Speed 1st layer	125	225

MAST SPECIFICATIONS

• Can be mounted on either truck or trailer • Built of finest "Manten" Angle Steel • Four Roller bearing sheave crown block • Unique crown assures straight block fall • Positive locking device controlled from ground • Safety Latch so mast cannot drop over four inches • Requires no additional guy lines • Hydraulic raising to vertical, lines to telescope upper section • Pipe racking platform automatically raised into position when upper section raised • Rod Basket built into mast for folding out • Meets all safety requirements • Road width of less than 8 feet • Meets highway requirements of length, width and height • Mast capacity 140,000 lbs.; hook load 4 lines.

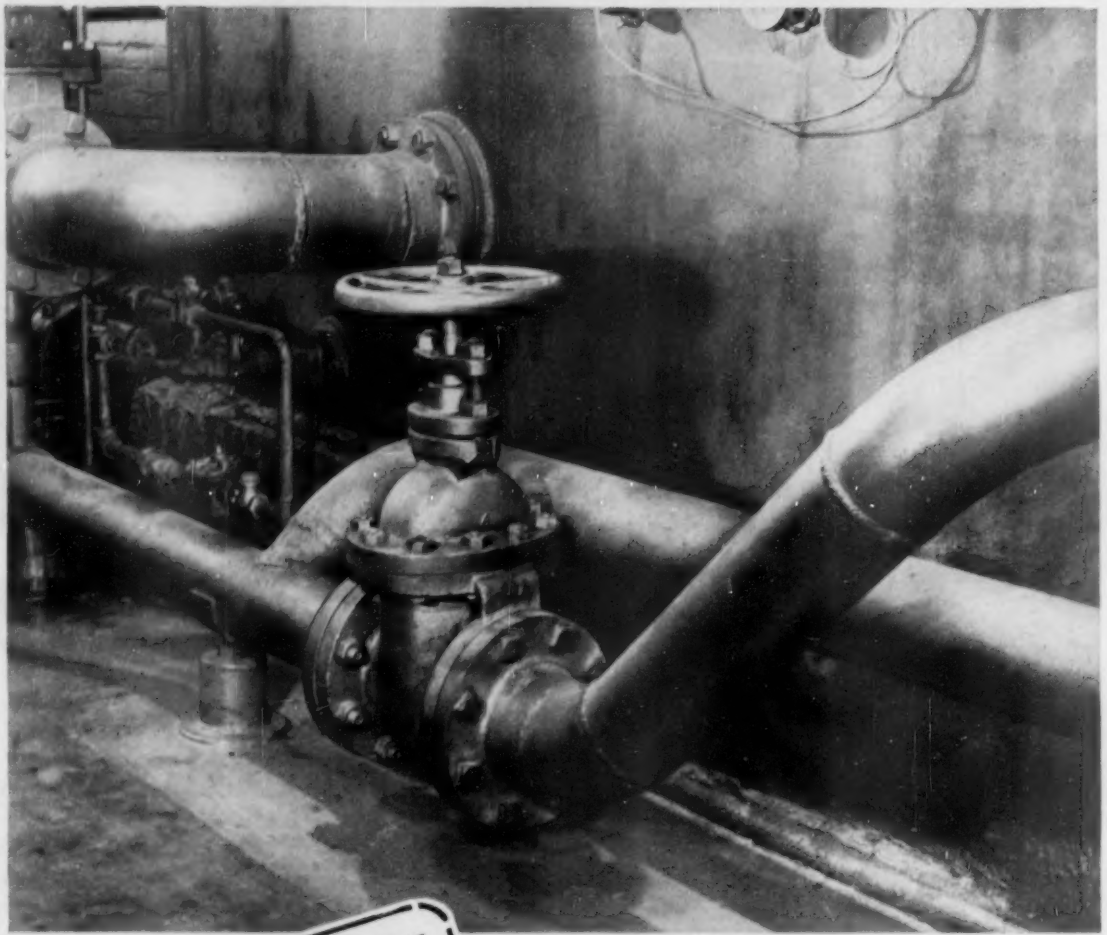
Wilson

The FIRST NAME in OIL FIELD WINCHES

WILSON MANUFACTURING CO., INC.

The Home of RED IRON WICHITA FALLS, TEXAS

How to cut corners that cost



ANOTHER JOB DONE BETTER WITH GLOBE WELDING FITTINGS

PIPING "corners" can be costly—costly in initial installation, continual maintenance, flow resistance, pressure-loss, erosion, and corrosion.

You can "cut the corners that cost" with Globe Welding Fittings. Installation is simpler—faster. Your piping is safer, stronger with less weight—needed space reduced —insulation is easier and faster. There is less chance for erosion, corrosion, and leakage to develop because of the smooth inner walls, true radii and circularity of Globe Welding Fttings. Liquids and gases flow smoothly with less resistance and pressure-loss.

Decide to "cut the corners that cost" on your next piping job — specify and use Globe Precision-Process Welding Fittings.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Fittings Department
3839 W. Burnham St. • Milwaukee 46, Wisconsin

B&W SEAMLESS and WELDED TUBES

He tests his purchases...

Do you?

Before he parts with $24.95, he tests a fishing rod to see how it will perform when the big ones strike. Yet last year, his department spent more than $100,000 for a cooling tower — and *nobody* has ever found out how it will perform under peak conditions!

Only a test will tell. The simplest and most positive test procedure is outlined in a new Marley technical publication, "Test Your Tower". By applying this conclusive test, you *know* the difference between actual and specified performance . . . you *know* how close your tower approaches the "guaranteed" performance you paid for.

With "Test Your Tower", a minimum of effort, and very little apparatus, you can determine performance of any industrial cooling tower under actual operating conditions. Just ask your Marley representative in any of 50 cities for your free copy, or mail the coupon below

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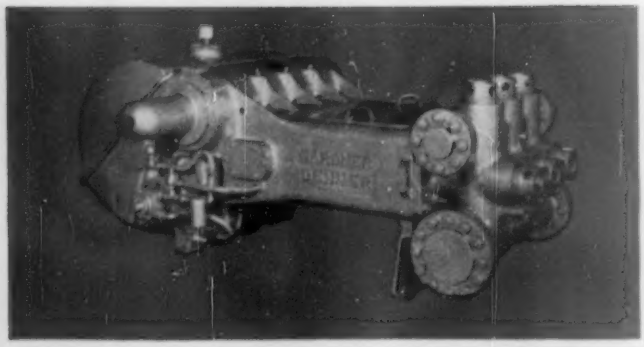
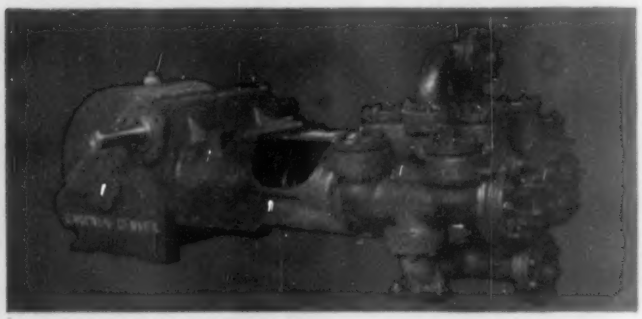
10,000 pounds pressure. Capacity ranges up to 408 g.p.m. Model PL-7 Six-Cylinder Plunger Pump.



8,000 pounds pressure. Capacity ranges up to 263 g.p.m. Model PA-8 Triplex Plunger Pump.



5,000 pounds pressure. Capacity ranges up to 211 g.p.m. Model FXX Duplex Power Pump. Models 15 to 100 h.p.

Three Gardner-Denver Pumps with a High-Pressure Punch

Built with the stamina you need for *water flooding — salt water disposal — fracturing — acidizing — cementing — well cleaning* and other high-pressure testing, completion, and servicing operations. Send for complete specifications.

GARDNER-DENVER Since 1859

KELLER TOOLS

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THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

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Continental Supply Co., Continental Bldg., Dallas, Texas
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Butyrate means pipe that is lightweight

Tenite Butyrate's light weight speeds installation. Three men can lay 4,000 feet of 4" Tenite pipe in a day. Eight men usually are needed to handle the same amount of metal pipe.

Butyrate means pipe that resists corrosion

You can bury Tenite Butyrate pipe and never worry about corrosion failures. Tenite resists corrosion by sour crudes, salt water and electrolytic soils.

Butyrate means pipe that resists paraffin clogging

You can prove to yourself that the smooth wall of Tenite Butyrate pipe offers no toe holds for paraffin. Install a test section like this in your present metal line.

What could Tenite Butyrate mean to you?

TENITE BUTYRATE PIPE means different things to different users. To a man troubled by corrosion, Tenite means pipe that resists the corrosive conditions found in oil fields. To a man pumping high-paraffin crude, Tenite means relief from the frequent cleaning of paraffin-plugged lines. To a man laying a long string, Tenite means a lightweight pipe—easy to handle, simple to join. Tenite means other things, too . . . greater flow with less load on pumps, good impact resistance, flexibility to follow the contours of the earth, less year-'round maintenance.

Tenite Butyrate can promise long, trouble-free service for your crude, brine and water disposal lines. Get the facts on Tenite. Learn how, in field after field, Tenite pipe has proved its practical value. Mail the coupon for more information and a list of Tenite pipe suppliers. EASTMAN CHEMICAL PRODUCTS, INC., Kingsport, Tennessee, subsidiary of Eastman Kodak Company.

TENITE
BUTYRATE
an Eastman plastic

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Please send me information on TENITE BUTYRATE PIPE and a list of companies manufacturing Tenite pipe and fittings.

NAME .....
POSITION .....
COMPANY .....
STREET .....
CITY ..... STATE .....

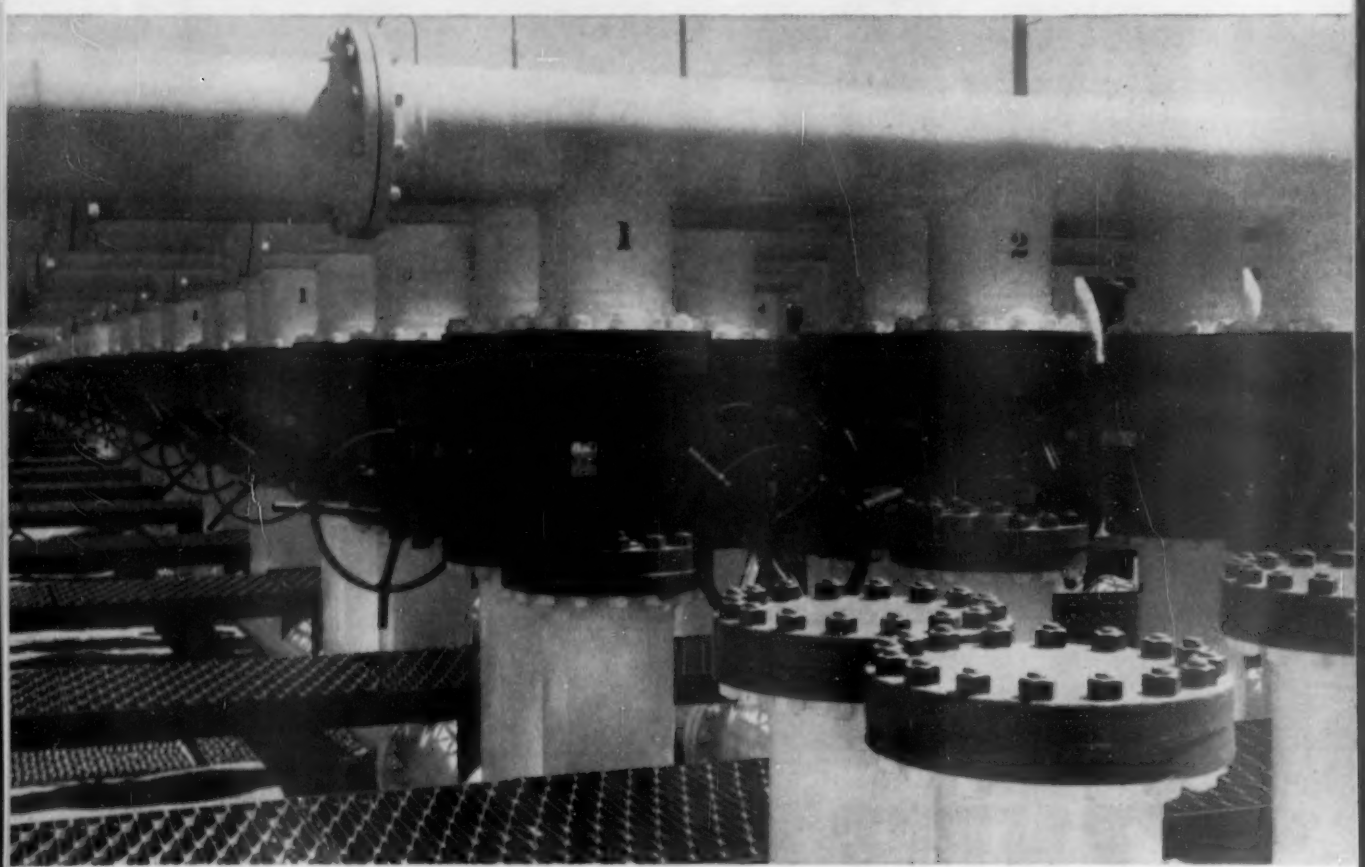
OG2-55

All along the

Costs down....efficiency up....with

There are three good reasons why you'll see Rockwell-Nordstrom valves all along most gas, petroleum or products pipe lines. *One:* pressurized lubricant sealing assures leakproof operation for the lightest hydrocarbons or heaviest fluids. *Two:* quarter-turn operation allows easy, positive control . . . ideal for remote power operation. *Three:* costly metal-to-metal friction on the working parts is eliminated by the tough, protective lubricant film . . . repair and replacement costs are slashed.

Valves represent one of the most important investments in any pipe line operation. All over the world, pipe line companies have found that investing in



These Rockwell-Nordstrom gear operated valves provide fast, positive, dependable control at this huge products terminal.

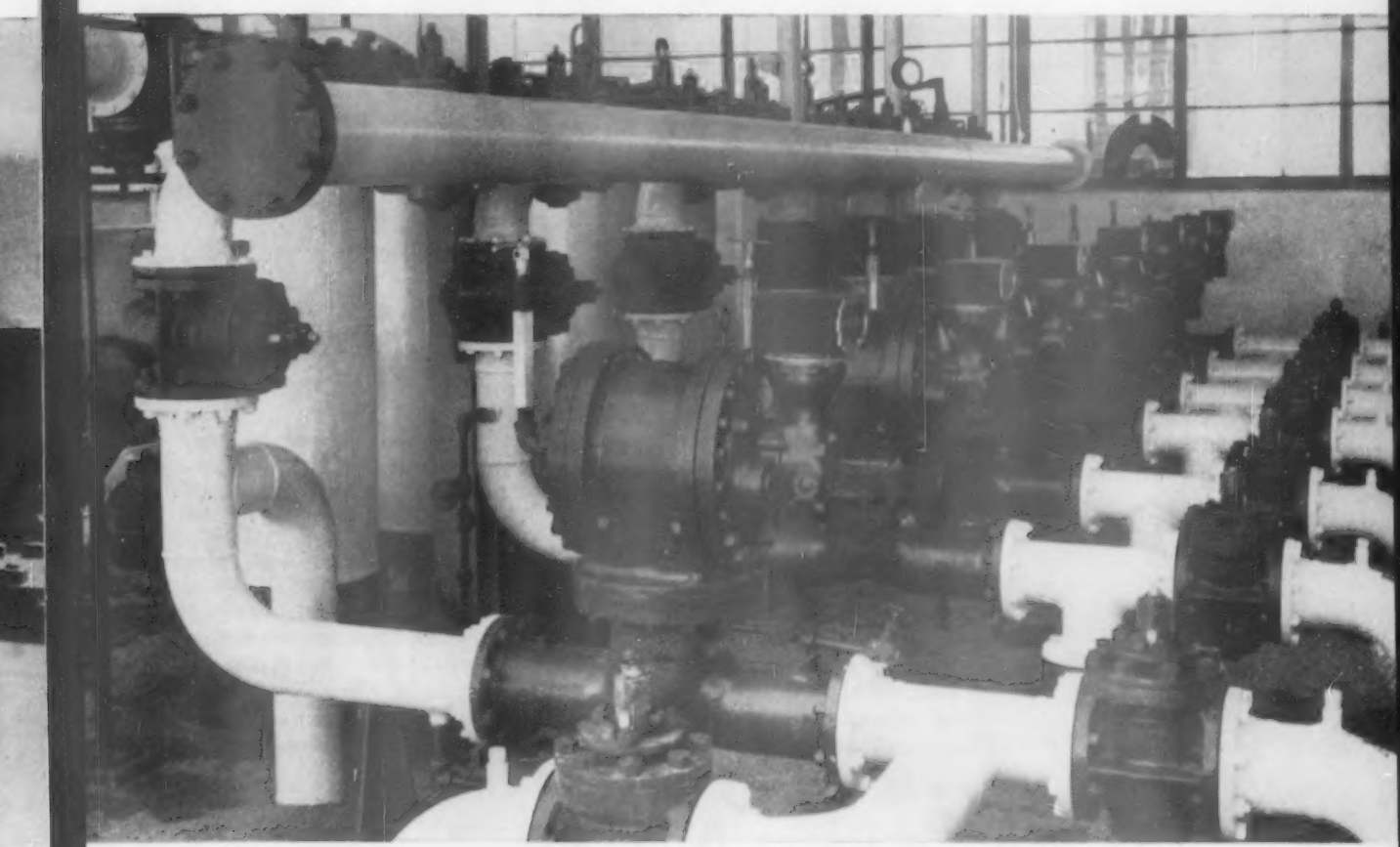
line

Rockwell-Nordstrom Valves

Rockwell-Nordstrom valves pays big dividends in greater dependability, and lower operating costs year after year.

Only with Rockwell-Nordstrom do you get a *complete* range of pressure ratings and sizes based on 40 years of lubricated plug valve leadership. Whatever your pipe line valve requirements, there is the exact Rockwell-Nordstrom valve, lubricant and operating accessory to do the job better, more dependably and at lower cost than any other valve you've ever used. Write for complete details today: Rockwell Manufacturing Company, Pittsburgh 8, Pa.

Canadian Valve Licensee: Peacock Brothers Limited.



Rockwell Rotocycle meters and wrench operated Rockwell-Nordstrom valves make the ideal combination for accurate measurement and dependable control at this products pipe line station.

ROCKWELL-Nordstrom VALVES

LUBRICANT SEALED FOR POSITIVE SHUT-OFF

KRALASTIC PIPE

RUSTPROOF · CORROSIONPROOF · LIGHTWEIGHT · TOUGH · SNAKEABLE

and it welds with a brush!

No need for expensive welding equipment—no time wasted—Kralastic pipe can be joined in *seconds* by *anyone!*

Just paint mating surfaces of Kralastic pipe and fitting with a special solvent or cement—slip them together and allow them time to set, and you have made a connection as durable as the pipe itself!

And Kralastic *is* durable!

It can't rust or rot, is permanently free of electrolytic corrosion. It's unharmed by soil acids, natural gas, most chemicals. And because it's one of the toughest of all plastic materials, it resists damage from tools, rocks, and rough handling.

What's more, Kralastic pipe is flexible enough to be snaked through many existing lines—to follow uneven ground contours without costly, job-prolonging fittings. And it's easily cut with an ordinary hacksaw.

This tough rubber-resin material—one of the first to produce successful plastic pipe—has proved itself not only in natural gas lines, oil field pipe, and valves of many kinds, but in hundreds of other *tough* applications as well.

Better investigate Kralastic® pipe and learn more of its *many* advantages. Write today to the address below.

Naugatuck Chemical

Division of United States Rubber Company
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CUSTOM-ENGINEERED—More Tractive Power —Less Dead Weight—through Stronger, Lighter Alloy Steels and Advanced Math-Matic Design!

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BUILDERS OF AMERICA'S FWD FOREMOST HEAVY-DUTY TRUCKS

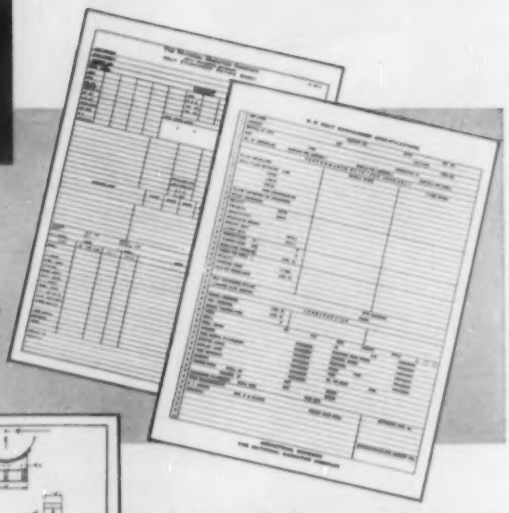
MATH-MATIC DESIGN

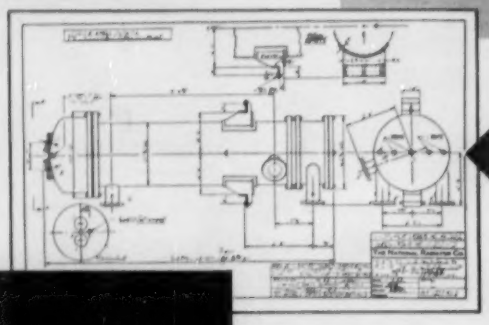
Write for informative, illustrated folder on FWD units in the weight category you normally use. Four and six wheel drive trucks from 14,500 to 60,000 lbs. G.V.W.

THE FOUR WHEEL DRIVE AUTO COMPANY, CLINTONVILLE, WISCONSIN, *Canadian Factory*, KITCHENER, ONTARIO

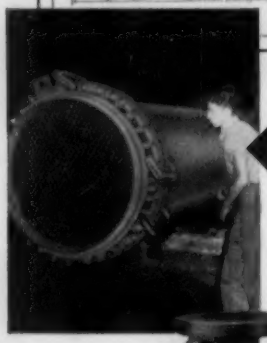
NATIONAL
SHELL and TUBE HEAT EXCHANGERS

Your heat exchanger problems will be handled completely and efficiently from individual specifications . . .





through latest design to highest standards



and careful fabrication . . .

to finished product

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NRC

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by the *Heat Transfer Division* of

THE NATIONAL RADIATOR COMPANY

JOHNSTOWN, PENNSYLVANIA

HEAT TRANSFER DIVISION HEADQUARTERS 60 East 42nd Street, New York

Meet Mr. Independent—Your friendly distributor who's always on the spot with oil field supplies, when and where you want them. He's the reason why . . .

For Fast, Personal Service

—these independent distributors who carry Pittsburgh Seamless drill pipe, oil well tubing, and casing are ready to meet your requirements.

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Utica National Bank Building
Tulsa 5, Oklahoma

Franklin Supply Company
624 South Michigan Avenue
Chicago 5, Illinois

Houston Oil Field Material Co.
1524 Maury Street
Houston, Texas

Industrial Supply Company
500 Eighth Street
Wichita Falls, Texas

Iverson Supply Company
400 West Fifth Street
Tulsa, Oklahoma

Lucey Export Corporation
233 Broadway
New York 7, New York

Lucey Products Corporation
624 South Cheyenne
Tulsa 19, Oklahoma

McJunkin Corporation
P. O. Box 513
Charleston 22, West Virginia

Midland Supply Company
Box 3105
Washington St. Station
Wichita 7, Kansas

Mountain Iron & Supply Co.
100 Rule Building
Wichita 2, Kansas

Murray Brooks, Incorporated
P. O. Box 855
Lake Charles, Louisiana

Norvell Wilder Supply Company
P. O. Box 4145
Beaumont, Texas

Producers Supply & Tool Co.
706 Commercial Standard Bldg.
Fort Worth 2, Texas

Rodman Supply Company
P. O. Box 2752
Odessa, Texas

Southwest Supply Company
1720 Oliver Building
Pittsburgh, Pennsylvania

Superior Iron Works & Supply Co.
P. O. Box 1800
Shreveport, Louisiana

Western Supply Company
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Oil Men Don't Buy From Strangers

• **The Can-Do Men**—The independent distributor offers oil men expert service that is geared for speed and flexibility, yet it is a more personal service based on long and friendly relationships.

The men who run these companies are local men in the oil fields. They concentrate on serving a small area more effectively, rather than playing the big field and scattering their efforts. Because they are not run by remote control or bound by rules and tradition, they can make decisions and give answers on the spot quickly. They depend for their livelihood on making the right decisions and having the right answers.

This ability to make decisions fast begins with the suppliers' salesmen and store managers who have lived for many years in day-in-and-day-out contact with the oil men. They often live in their stores, offering 24-hour service on even the smallest items of equipment. They know their customers, know their problems and work with them in a sort of partnership.

• **Free Selection**—The independent distributor has an advantage in the range and variety of products he carries for oil men. Because he is independent, he can select from nearly the entire field of manufacturers and deal with those firms he knows will provide the best in quality and service.

Today, with seamless tubular goods in easier supply, oil men who have become more cost-conscious are depending more on the local distributors because they know they are operating with less overhead. This means continued personal service at prices that are competitive.

Today Pittsburgh seamless is distributed through 19 independent suppliers who operate a total of 141 stores in every major oil field in the country and some abroad. If you are a drilling contractor, a producer, an engineer, or purchasing agent for an oil company—why not get the pipe of your choice through the supplier of your choice? Next time you order seamless pipe, *specify Pittsburgh!* Call one of the distributors listed at left.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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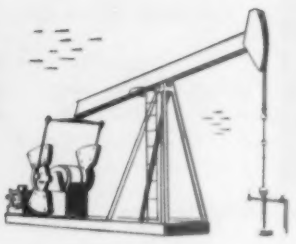
Write for your copy of the color brochure "The New Pittsburgh Steel Company."

Your SUPPLY CENTER at the CROSS ROADS of SERVICE

STRATEGIC LOCATIONS

COMPLETE STOCKS

SUPPLY BOVAIRD COMPANY



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FRIENDLY COOPERATION

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WHERE YOU WANT IT
WHEN YOU NEED IT . . .
AT REASONABLE COMPETITIVE PRICES

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PARTNERS IN PETROLEUM PROGRESS

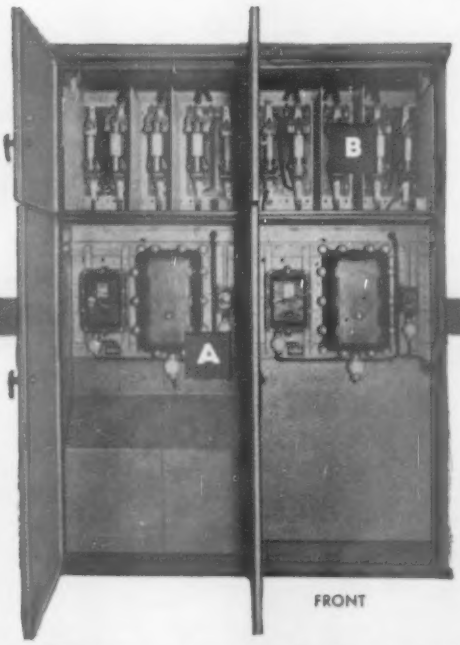
THE Bovaird SUPPLY COMPANY

GENERAL OFFICES
TULSA, OKLAHOMA

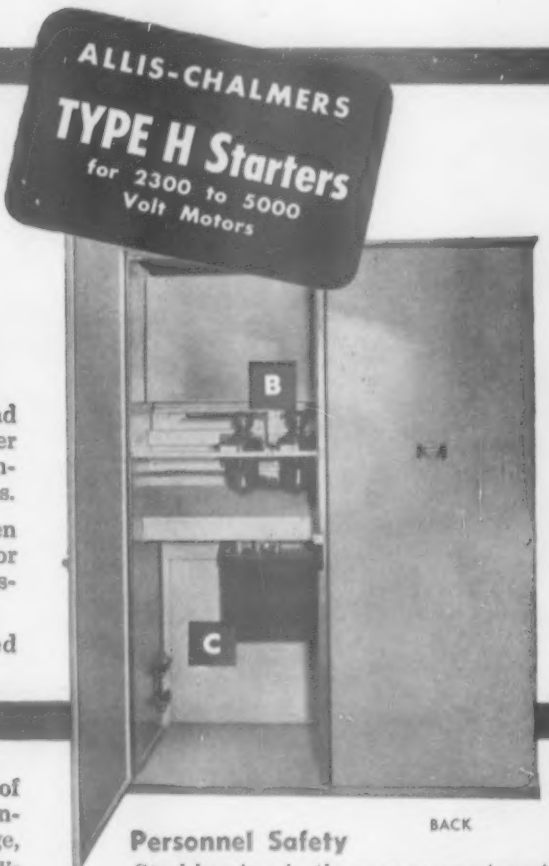
84 YEARS OF PROGRESS WITH THE OIL INDUSTRY

Engineered for SAFE Operation in Semi-Hazardous Locations

Built into every Allis-Chalmers Type H starter is the type and degree of protection dictated by applications. In these particular starters, installed in a semi-hazardous location, all arcing contacts are under oil or in explosion-proof cases.



FRONT



BACK

A All overload, undervoltage, timing and auxiliary control relays, as well as other low voltage switching devices, are enclosed in NEMA VII explosion-proof cases.

B Fuse disconnects cannot be pulled when carrying current. Fuse compartment door is *key-interlocked* to the control transformer primary oil cutouts.

C Main contactor is of the oil-immersed type.

Type H starters are built in a wide range of ratings for squirrel-cage, wound-rotor and synchronous motors — for full or reduced voltage, reversing or non-reversing — with plugging, dynamic-braking and multi-speed features. A new bulletin, 14B6410B, tells the complete story. See your nearby Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Personnel Safety

Steel barriers in the rear compartment prevent accidental contact with exposed live high voltage parts when operating the oil cutouts or removing the interlock key.

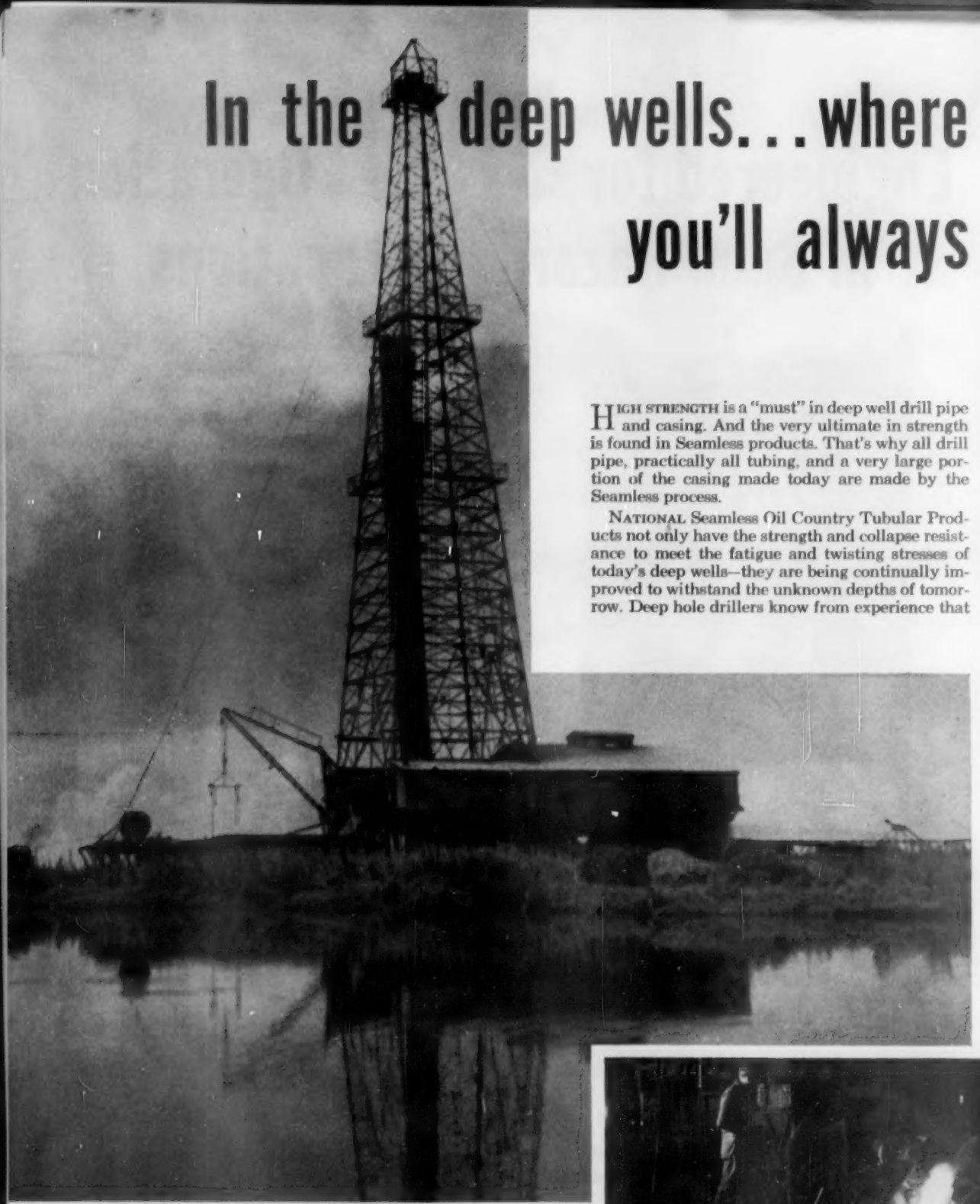
A-4446

ALLIS-CHALMERS

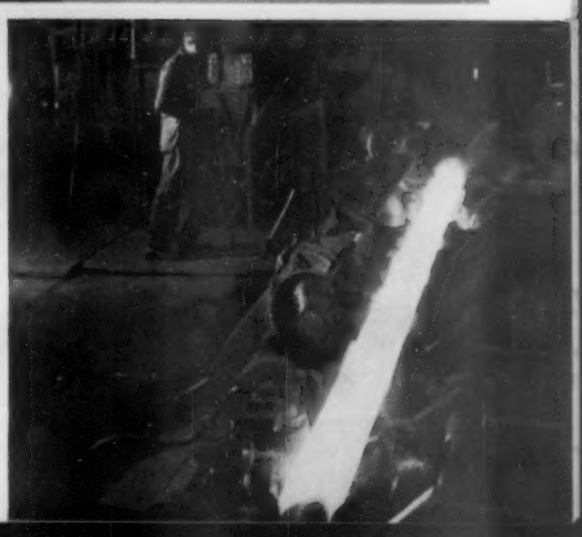
In the deep wells...where you'll always

HIGH STRENGTH is a "must" in deep well drill pipe and casing. And the very ultimate in strength is found in Seamless products. That's why all drill pipe, practically all tubing, and a very large portion of the casing made today are made by the Seamless process.

NATIONAL Seamless Oil Country Tubular Products not only have the strength and collapse resistance to meet the fatigue and twisting stresses of today's deep wells—they are being continually improved to withstand the unknown depths of tomorrow. Deep hole drillers know from experience that



▲ **One of the World's Deepest Producing Wells**—Shell Oil's Gonsoulin-Minvielle State Unit No. 2 at Weeks Island Field, Louisiana was drilled to 18,568 feet—with no difficulties encountered. 4,300 feet of NATIONAL N-80 Buttress-Thread Casing were used at the top of the string to support another 14,000 feet of 9⅝ inch casing.



Where Strength Starts—The Seamless Method is one of the most difficult forging operations in the steel industry. Only steel of the very best forging properties and of high uniformity can be used, since piercing the solid billet tends to search out any defects in the metal. ▶

STRENGTH is most important find NATIONAL SEAMLESS

they can work NATIONAL Seamless hard and deep, with complete confidence . . . now and in the future.

Here are some significant National Tube Developments in the oil and gas industry:

NATIONAL DEOXIDIZED BESSEMER STEEL CASING AND TUBING—GRADES H-40, J-55

Especially well-suited for oil production because of its combination of high yield strength and good ductility.

NATIONAL WARM-WORKED CASING—GRADE N-80

An extremely high-strength casing possessing a uniformity of physical properties which gives it high collapse resistance and greatly increased joint strength, hydrostatically tested to 80% of minimum yield strength up to a maximum of 10,000 p.s.i.

NATIONAL DEEP-WELL CASING

A stronger casing than is provided under A.P.I. specifications, to meet constantly increasing depths. Because it is intended for severe service it is hydrostatically tested to 80% of minimum yield strength up to a maximum of 12,000 p.s.i.

NATIONAL (B) BUTTRESS-THREAD CASING

Developed to satisfy the need for a casing joint which will safely and economically support the weight of deep-well casing. The buttress-thread joint is comparable in strength to that of the body of the pipe.

For complete details on NATIONAL *Seamless drill pipe, casing and tubing, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.*

NATIONAL TUBE DIVISION
UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS NATIONAL SEAMLESS PIPE AND TUBES

USS

UNITED STATES STEEL

Check the looks!

Ice, Sleet, Snow—*SLOW!*

Try the comfort!

Then, to get the most for your money

LOOK UNDER THE HOOD!

A revolution in truck power is taking place . . . sparked by the Ford Short-Stroke V-8!

When a new type of engine prolongs piston ring life as much as 53% . . . gives gas savings of up to 1 gallon in 7 . . . cuts engine friction as much as 33% to liberate more *usable hauling power*, you know it's bound to go over big with economy-minded truck users.

A new MONEY MAKER for oil field work—the '55 Ford T-800 Tandem Axle Big Job! Powered by the mighty Short-Stroke 170-h.p. *Cargo King* V-8, it is rated for 40,000 lbs. GVW, 60,000 lbs. GCW. *Master-Guide* Power Steering is standard equipment! Modern, rubber-bushed tandem suspension.

Small wonder, then, that the truck industry is now investing millions of dollars *under the hood* . . . in a revolutionary switch to Short-Stroke V-8's.

But Ford, pioneer in V-8 truck power, made the switch over three years ago. And right *now*, you'll find a *proven*, modern Short-Stroke engine under the hood of every Ford Truck. Only Ford offers a full line of Short-Stroke engines . . . four V-8's and a Six.

Make sure your next truck is a modern Money Maker. Look *under the hood!* Look for a modern Short-Stroke engine with a "stroke" as short as, or shorter than its "bore." And remember, you get the full advantages of Short-Stroke design *today* in any Ford Truck you choose.

Call your Ford Dealer or write: Ford Division, Ford Motor Co., Dept. T-20, Box 658, Dearborn, Mich.

FORD

Triple Economy

TRUCKS

THE MONEY MAKERS FOR '55

VALVE OPENING equals PIPE OPENING

4" valve ...port area— 12.75 sq. in.

4" pipe ...area— 12.73 sq. in.

That's the formula of success behind **acf** Rectangular Port Valves! Because they have a port area at least equal to the pipe itself... turbulence and loss of head pressure are held to a minimum... even when handling heavy slurries and other viscous ladings.

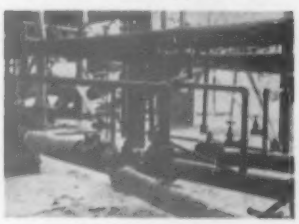
All **acf** *Cylindrical* Lubricated Plug Valves... both those with rectangular and round port openings ...feature split-second, quarter-turn shut off that meets the rigid control requirements in the petroleum, natural gas, and processing industries. Maintenance is especially low because they are fitted with TEFLON* gaskets to prevent head leakage, and have no line seats exposed to fluid flow.

ACT NOW TO KEEP DOWN VALVE MAINTENANCE COSTS!

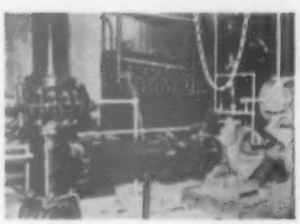
Representatives in 50 Principal Cities. Write for Descriptive Catalog 5-OG, **acf** Industries, Incorporated, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Mich.

*DuPont Tradename

On Petroleum Applications

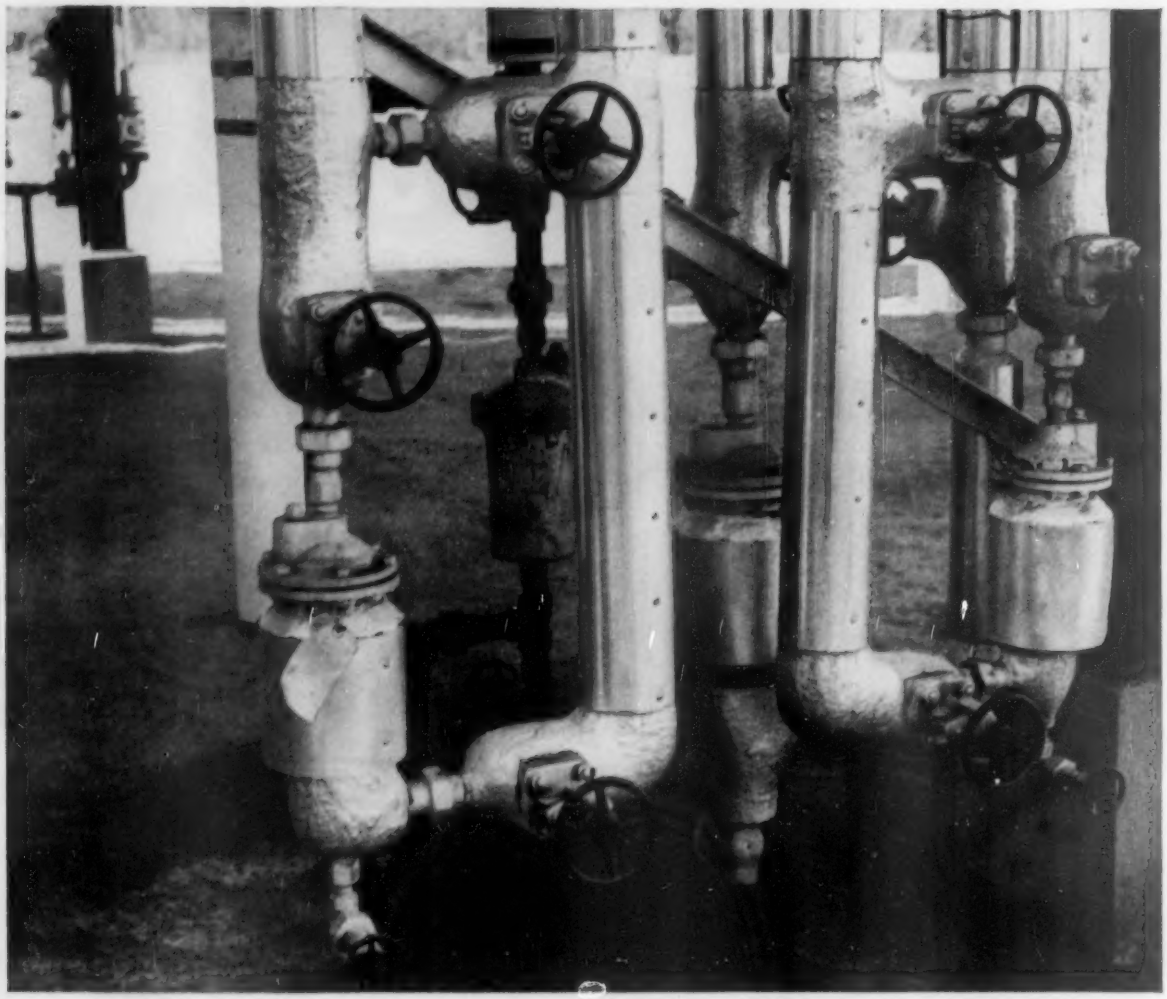


In Chemical Plants



In Sewage Treatment

acf CYLINDRICAL FULL PIPE AREA **PLUG VALVES**



Picture of Low Cost Steam Trapping . . .

The Armstrong steam traps pictured above are in a field processing plant in Oklahoma. It's a nice installation—traps neatly installed in bypasses, lines well insulated, blowdown valve below each trap. Obviously, no corners have been cut to save nickels. Then, what do we mean by "picture of *low cost* steam trapping." Simply this:

Low cost traps—the price tag doesn't read any lower, but, because of high capacity, you can usually select an Armstrong trap one size smaller than other makes.

Low cost installation — Armstrong offers a choice of either side inlet-side outlet or bottom inlet-top outlet traps in most sizes so that hook-ups can be made with a minimum of labor and fittings. All traps can be equipped with internal check valves, and the three smallest traps are available in integral strainer style. These optional built-in features mean lower installation costs.

Low cost maintenance—Armstrong traps last for long periods without repairs because the valves and seats are corrosion-resistant, file-hard chrome steel, ground and then lapped together; and all other working parts are corrosion-resistant stainless steel. Materials and workmanship are unconditionally guaranteed.

Low production costs—because Armstrong traps provide fast drainage and have large air handling capacity, they provide maximum output from steam heated units and give a bigger return on equipment investment. They save steam, too, through reduction of non-productive radiation losses and freedom from leakage.

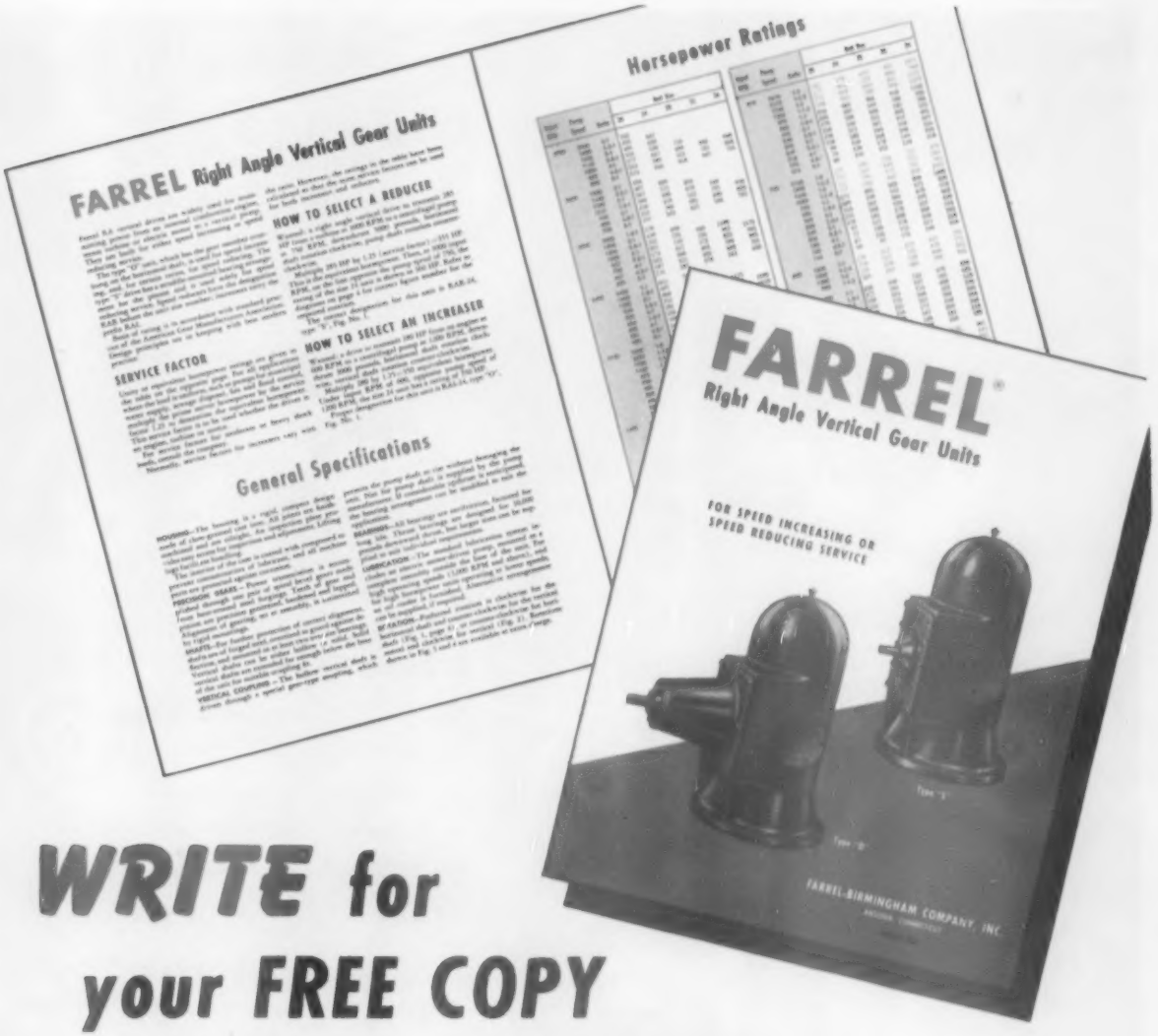
For *low cost* trapping it pays to specify "traps shall be Armstrong."

ARMSTRONG MACHINE WORKS
868 Maple Street • Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

ASK FOR CATALOG

Complete selection, installation, maintenance and trap data in the useful 44-page Steam Trap Book. Call your local Armstrong Representative or write Armstrong Machine Works.



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If you buy, specify, or are in charge of the operation of vertical drives for pumping service, you should have a copy of this new bulletin. It includes such valuable information as, How to Select a Reducer or Increaser, Horsepower Ratings, General Specifications, etc.

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. . . A simple, sturdy, self-contained regulator that is suitable for steam, air, gas, oil, water and other fluids.

TYPE 95H features hardened stainless steel trim . . . flat seat . . . machine lapped seating surfaces for tight shut-off for high pressure, high temperature service.

TYPE 95L has soft seat construction for low temperature service.

Sizes: ¼", ⅜", ½", ¾", 1". Outlet pressures from 2 to 30 PSI; 15 to 150 PSI. Size for size, compare its capacity.

Write for Bulletin C-95.

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LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

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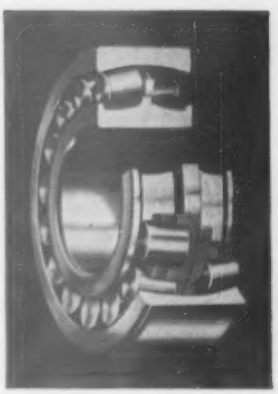
IN THE OIL INDUSTRY, TORRINGTON BEARINGS *are used in many applications, including rotary tables, slush pumps, draw works, blocks, swivels, pumping units.*

TORRINGTON Spherical Roller Bearings

are designed with integral center flange on inner race to provide positive radial stability and positioning for thrust loads



This center flange guides the rollers accurately and friction is reduced to a minimum.

Other performance-building features include accurate geometrical conformity between races and rollers to provide ultimate load carrying capacity; carefully heat-treated races and rollers for maximum resistance to shock and wear; one-piece machined bronze cage for each path of rollers to allow thorough lubrication and give freedom of operation.

These are some of the reasons why TORRINGTON SPHERICAL ROLLER BEARINGS give long, satisfactory performance.

TORRINGTON SPHERICAL ROLLER BEARINGS are available from stock with either straight or tapered bore, for shaft or adapter mounting.

Specify TORRINGTON and get these operational advantages in your equipment.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.

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TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers

2400 H.P. POSSIBLE WITH THESE
4 CUMMINS VT-12 ENGINES
Cummins VT-12
Diesel
600 HP AT 2100 RPM
TURBOCHARGED . . . for extra horsepower at the flywheel without a corresponding increase in engine load.
MORE POWER PER POUND . . . only 10.38 lbs. per horsepower. Engine weighs 6200 lbs. with standard accessories.

Plenty of POWER for Deepest Drilling

The new Cummins VT-12 is proving to be the answer to the long felt need for a BIG engine combining famous Cummins dependability and economy with HIGH HORSEPOWER, COMPACTNESS, and REDUCED WEIGHT.

Compounded in the proper Mid-Continent Multiple Engine Rig Drive, VT-12's provide dependable power for making "MORE HOLE FASTER."

For complete information write to
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MID-CONTINENT Supply Company
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THE WORLD'S LARGEST INDEPENDENT OIL FIELD SUPPLY COMPANY

...and Drayton Valley had a good start

Before the geologists and drillers arrived, Drayton Valley was just another stretch of grassy, sparsely populated Alberta flatland. But their search for oil changed all this . . . and Drayton Valley had a good start.

National Supply opened its Drayton Valley store—before this Canadian town was completely mapped or had street names. Arriving early and well-equipped, National was ready to serve the oil men with the equipment and supplies they needed to drill in the surrounding territory. It was a new town . . . but a typical situation.

Many of National's 124 stores were opened under similar circumstances. And in the early days of newly developing areas, many have served as "town halls" where operators met not only to buy, but to exchange their stories of good and bad fortune in a friendly atmosphere. National is usually among the first suppliers to arrive, and often the last to leave.

In remote places like Drayton Valley, National is a familiar pioneer. Wherever operators need quality equipment and alert supply service, National gets on the job fast. This consistent policy is one of the reasons why National is the oil industry's largest supplier. And the confidence of customers like those in Drayton Valley keeps us that way.

First in quality . . . First in supply service
in oil country everywhere

THE
NATIONAL
SUPPLY
COMPANY

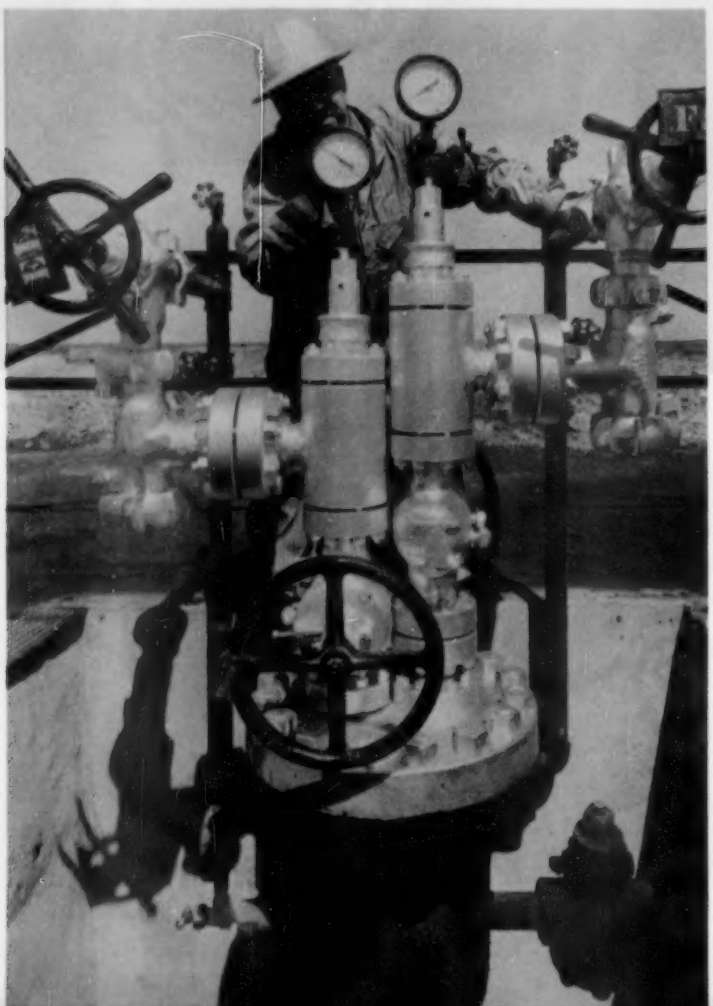
Want improved efficiency...greater safety?

SPECIFY "ADVANCED DESIGN" NATIONAL WELLHEAD EQUIPMENT

Research and development to improve wellhead assembly component parts is a never ending job at National Supply's Houston Plant. In manufacturing also, the machining, gauging and testing practices check out every component part, while advanced hydraulic testing methods prove the reliability of each assembly under conditions more severe than specified by API standards.

That's why you will find that National Wellhead Equipment offers features for economy and safety that mean maximum equipment performance. There's flexibility of design that allows you to choose from a multitude of combinations to meet your well's particular requirements in size, capacity and type. Moreover, there's extra component part strength for longer service life and greater safety. Assembly of components is simple. Parts are self-locating and self-centering, and no special tools or adjustments are needed.

For all your requirements in wellhead equipment, National Supply's Houston Plant and National Supply Stores everywhere carry a wide variety of tubing hangers, bonnets, valves, flanged and threaded fittings, adjustable chokes and flow beans, flow assemblies and other specialty items for well completion or wellhead servicing. Why not talk over your specific well requirements with the local National Supply representative and National equipment specialist soon?



This National dual completion wellhead is a new development for operating two parallel strings of independently run 2-inch tubing. Individual master valves permit maintenance operations on one string, without affecting production in the other string.

First in quality . . .
First in supply service
in oil country everywhere

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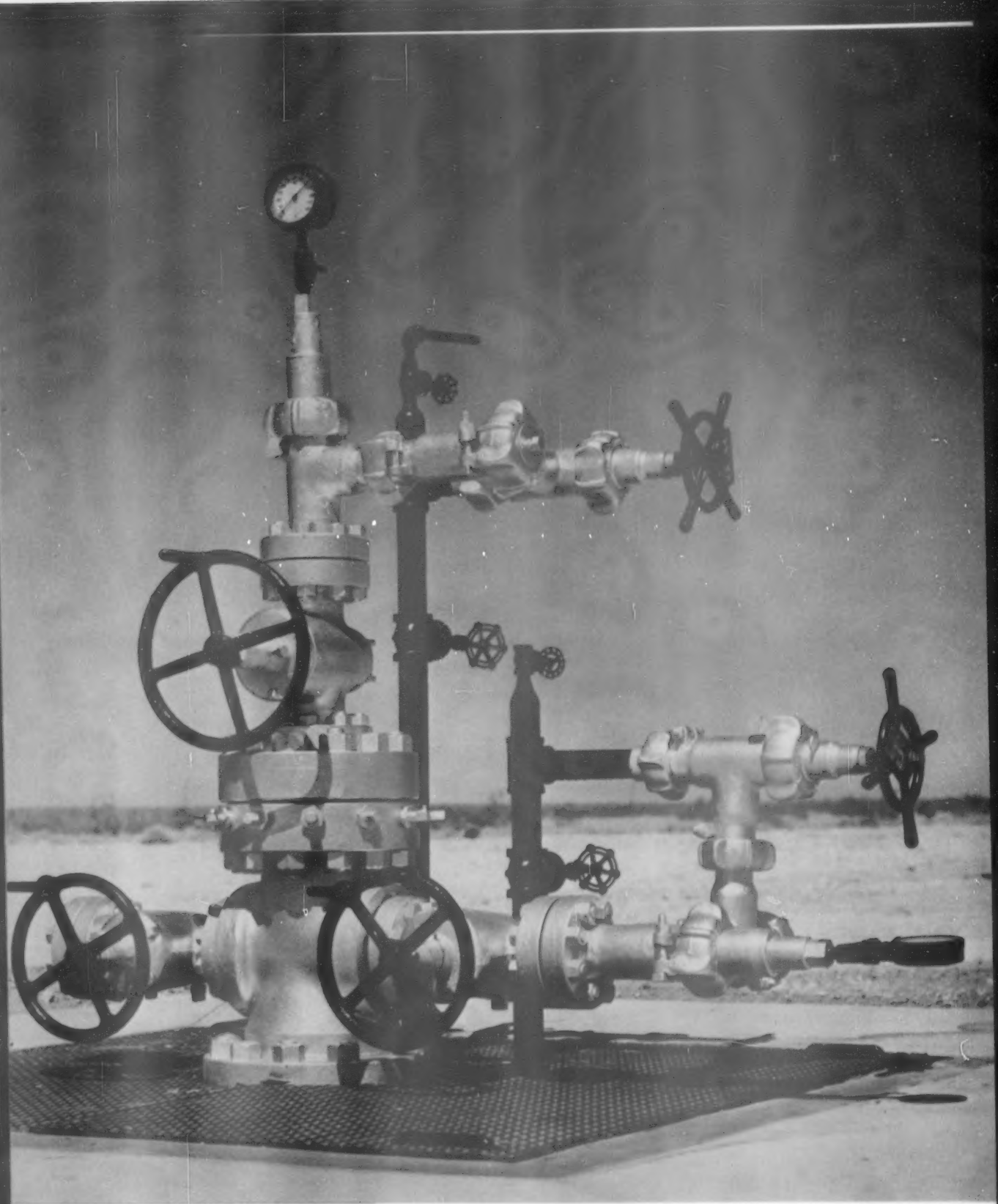
NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE SUPERIOR AND ATLAS ENGINES



National Wellhead Equipment is available in a complete range of test, working pressures and depth ratings for every well requirement.

See the next page for other

NATIONAL PRODUCTION EQUIPMENT

...and for profitable recovery by any method

specify **NATIONAL production equipment**

NATIONAL *Pumping Units*

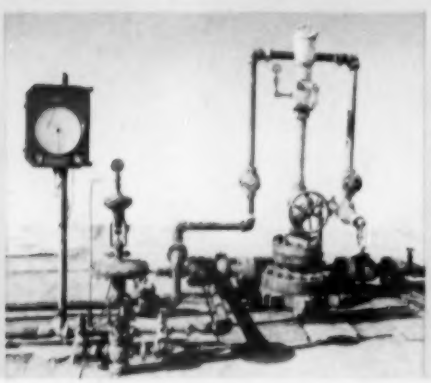
are manufactured in 38 standard combinations, API rated beam loads from 3,200 to 32,400 lbs.—there's a model to economically suit every pumping job.

NATIONAL *Sucker Rods*

are precision-manufactured in a range of grades engineered to suit virtually all well conditions, and readily available at the National Supply Store nearest you.

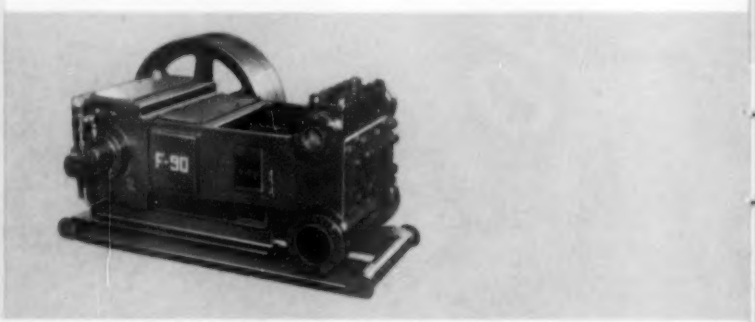
NATIONAL'S *Ideal Plunger Lift*

uses formation pressure for economically producing wells where reservoir conditions are suitable. For these certain types of wells, Ideal Plunger Lift can be the best production method to use.



NATIONAL *Triplex Pumps*

provide maximum volume and injection pressures for today's waterflood projects. Available in several hp ratings for both corrosive and non-corrosive service, these National Pumps are especially suited as power-oil source for sub-surface hydraulic pumping, oil gathering and salt water disposal services.



Be sure to have all of the facts on National Production Equipment for either primary or secondary recovery operations. Complete technical information and product bulletins are available from the National Supply representative or National Supply Store in your area.

First in quality . . . First in supply service in oil country everywhere

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NATIONAL BLUE OIL FIELD MACHINERY AND EQUIPMENT
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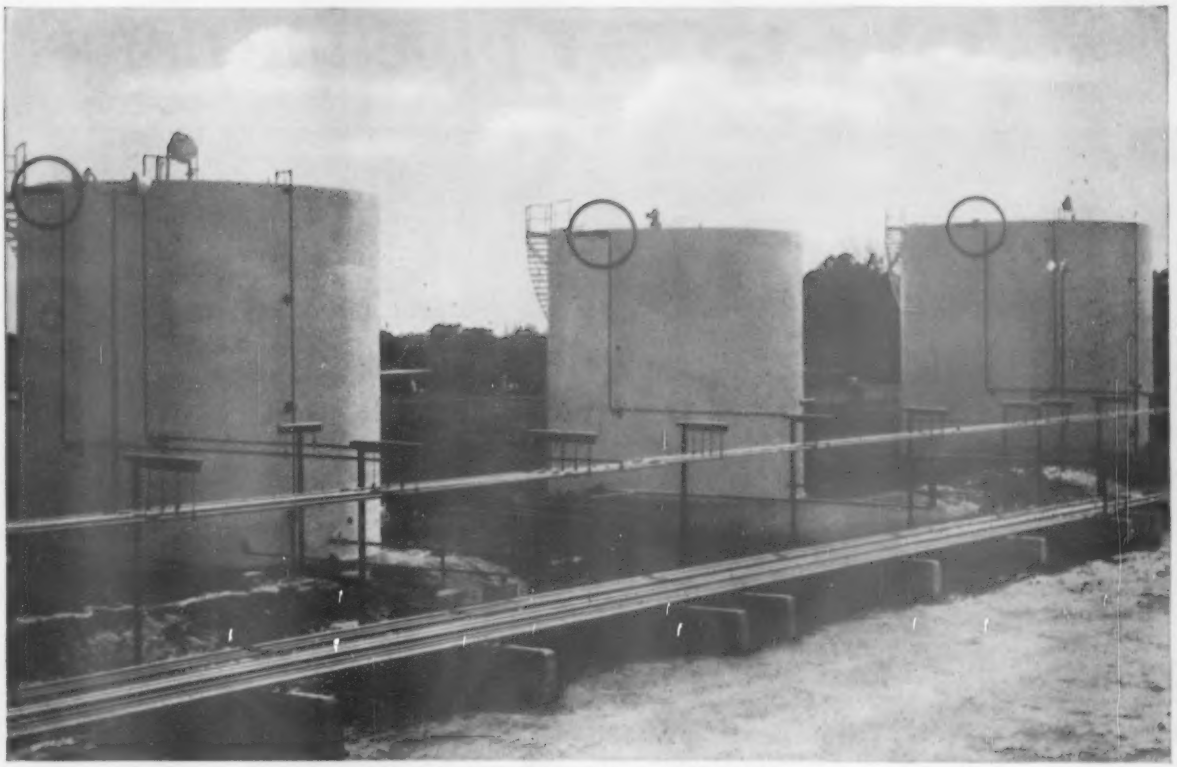


Rockwood Double Barrelled Foam Maker Chambers (circled) guard oil storage tanks in a southern refinery above.

The bubbles that keep oil safe

The tube-like objects circled in the photograph above have a special way of generating bubbles that safeguards the oil within the storage tanks.

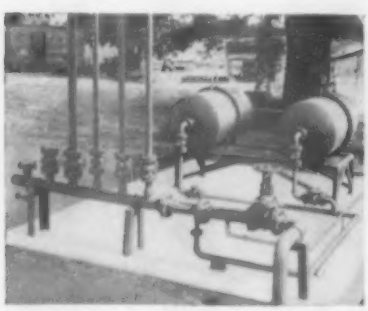
Should fire break out, these tubes — Rockwood Double Barrelled FOAM Maker Chambers — will swiftly pour a smothering FOAM blanket over the flames, controlling and extinguishing the fire. What's more, they pour a denser type of Rockwood FOAM blanket than ordinarily produced.

Inside each tube are two concentric barrels, one within the other. Internal impinging jets discharge into these barrels, dynamically mixing air, water and FOAM into a finer bubble structure than ordinarily possible and thus producing the extra-dense blanket that keeps oil safe.

This patented construction of Rockwood Double Barrelled FOAM Maker Chambers is typical of the careful way in which Rockwood engineers every detail of a Rockwood SpotPROTECTION System. These systems take the danger out of danger "spots", protect lives, property, money. Take advantage of them for your own protection.

ROCKWOOD SPRINKLER COMPANY

Engineers Water . . . to Cut Fire Losses



These Rockwood SpotPROTECTION Liquid Storage Tanks contain Rockwood FOAM. A balanced pressure proportioning system automatically proportions the FOAM into the water. This properly balanced mixture is then fed into the system that protects the tanks.

Rockwood Double Strength Foam clings to metal surfaces as an insulator — FOAM Liquid flows freely at sub-zero temperatures. Excellent for extinguishing fires in gasoline, benzol and other highly volatile liquids as well as ordinary combustibles.

SEND FOR THIS INFORMATIVE BOOKLET

ROCKWOOD SPRINKLER COMPANY
Portable Fire Protection Division
326 Harlow Street
Worcester 5, Mass.

Please send me your illustrated booklet on Rockwood fire-fighting products.

Name_____

Title_____

Company_____

Street_____ City_____

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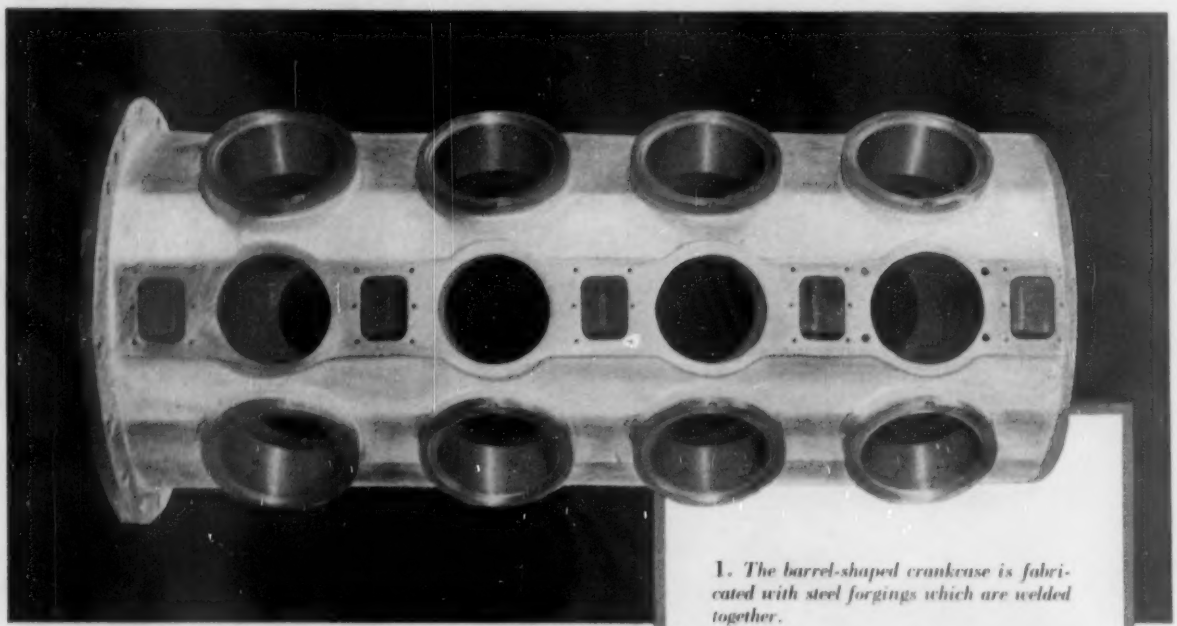
For **LOW-COST** *pipeline power*



1. *The barrel-shaped crankcase is fabricated with steel forgings which are welded together.*

2. *The inner portion of the case with its bulkhead construction provides uniform main bearing support.*

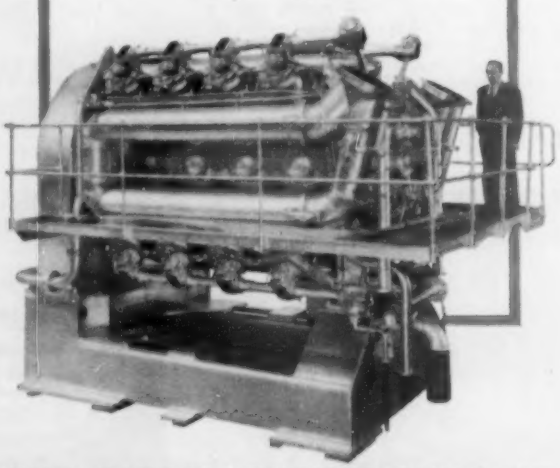
3. *The individual cylinders are mounted to the crankcase by means of clamping rings.*

DEVELOPED for quicker, easier maintenance, General Motors' 358-H engine cuts pipeline construction costs. This engine with attached accessories weighs less than 22 pounds per horsepower. Because of its light weight and smooth operation, foundation requirements are materially reduced.

This 2-cycle loop-scavenged engine, operating at 600 r.p.m., teams up with modern centrifugal compressors or petroleum pumps for efficient pumping.

Building or planning a pipeline, it will pay you to write today for full details and engineering specifications on this medium-speed General Motors 3300-horsepower gas engine.

General Motors'
358-H
Gas Engine



GM
CLEVELAND DIESEL

CLEVELAND DIESEL ENGINE DIVISION
General Motors • 2160 West 106th Street, Cleveland 11, Ohio

BUILDERS OF DIESEL, DUAL-FUEL AND NATURAL-GAS-BURNING ENGINES—FROM 150 TO 3300 H.P.

Packaged Compressor Plants
engineered to YOUR conditions . . .

- YOUR CHOICE of compressor, cooler, auxiliaries and arrangement.
- TO YOUR requirements for capacity and pressures, handling YOUR gas.
- Complete instrumentation for safe, efficient, unattended operation.
- Compact. Rugged. "Unitized" design—all components on single steel skid for trailer transport.
- COMPLETE SERVICE: (1) process engineering, (2) custom fabrication, (3) field erection **anywhere**, if required.

Write for Bulletin

Take it up with Stearns-Roger

Get our 30 years gas engineering experience—with special know-how in WINTERIZING for cold country operations.

Get the economy of mass production plant facilities and methods, plus transportation savings from our centrally located Denver shops.

Stearns-Roger

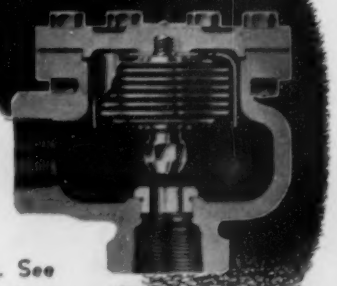
THE STEARNS-ROGER MFG. CO. DENVER, COLORADO

DENVER • HOUSTON • EL PASO • SALT LAKE CITY

Stearns-Roger Engineering Company, Ltd., Calgary, Alberta

NICHOLSON TRAPS

for every plant application



Send for Nicholson catalog 953. This 32-page standard reference on advance-type trapping of steam, air and other mediums contains: installation diagrams, charts for determining trap sizes, and advice on specific problems. See why leading plants are increasingly standardizing on Nicholson traps for increased production and minimum maintenance: thermostatic (illustrated) and metal expansion for pressures to 250 lbs.; weight and piston-operated, to 1500 lbs.

Send for Helpful Booklet

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

210 Oregon Street, Wilkes-Barre, Pa.

designed especially for *continuous* outdoor use . . .

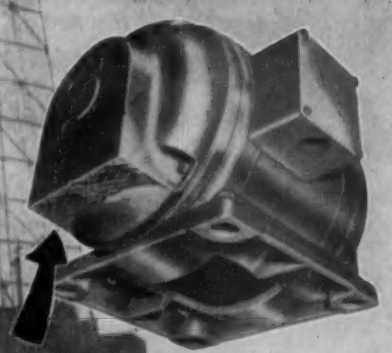
FIELDMASTER

BALL BEARING MOTORS

More and more FIELDMASTER Ball Bearing Motors are purchased for oil field use than ever before. Here's why: These **rugged** motors are **specially built** to meet the **tough** and **varied demands** of continuous outdoor use.

For example — heavy cast base assures alignment stability . . . heavy-duty, double-shielded, pre-lubricated bearings increase performance, reduce lubrication problems . . . high-grade silicon steel in the magnetic circuit reduces iron losses . . . wide variety of windings provides triple ratings, dual voltages . . . high torque licks heavy starting problems . . . high slip is available to take care of reciprocating load requirements encountered in pumping.

The FIELDMASTER has many other **outstanding advantages** that our distributor, the **BETHLEHEM SUPPLY COMPANY**, will be happy to show you. May we have them contact you . . . **without obligation?**



Screened Air Port Keeps Out Rodents!

VALLEY ELECTRIC CORP. 4221 FOREST PARK BLVD., ST. LOUIS, MO.

They Say—

Control Can Spread

"How can you regulate the gas without regulating oil that comes out of the same hole?

"If you can justify the regulation of one commodity that goes into interstate commerce, you can justify the regulation of all of them. You can control coal—and you can control wheat and corn and cattle and every other commodity.

"Both the American Farm Bureau Federation and the National Grange, realizing the full import of this situation, have passed resolutions asking for an end to federal controls over the independent-gas producers . . ."

John E. Swearingen, Chicago, production vice president of Standard Oil Co. (Ind.), in an address in Fargo, N. D., before the Farmers Grain Dealers Association of North Dakota.

Liked Alaskan Story

Dear Sir:

We feel that the Journal did an excellent job of presenting the Alaskan story (January 17 issue, page 62).

I am wondering if you might have a few extra copies of this article which we could have for our files. We would greatly appreciate receiving any number you can spare.

George H. Cobb
Assistant to the President
Kerr-McGee Oil Industries, Inc.
Oklahoma City.

Figuring Drilling Costs

Dear Sir:

We were pleased by your article on page 78 of the January 17 issue, "Cheap Bids Lead to Junk Equipment." The trend toward competitive bids on each well is being encouraged by the major oil companies, even in Illinois where only shallow wells are drilled and where field prices have been established.

The fact that rigs are idle has led many companies to ask for competitive bids on almost all wells, which of course has resulted in a deteriorating price condition which is gradually getting worse. The only way the lower bid can be justified is by increasing efficiency, which is not usually sufficient

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ALICE, TEX.
phone 4-6557
EDNA, TEX.
phone 4851
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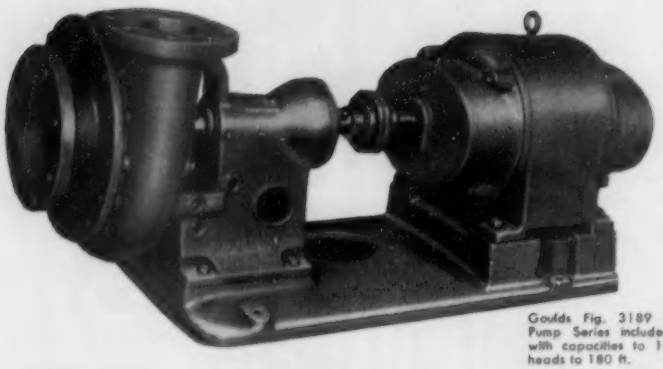
AND Manufacturing COMPANY
TULSA, OKLAHOMA

COURTESY ● SERVICE ● DEPENDABILITY



Goulds Fig. 3189 Centrifugal Pump Series includes 10 sizes with capacities to 1080 GPM, heads to 180 ft.

interesting facts

. . . about a new series of Goulds Multi-Purpose Centrifugal Pumps

Newest in a line of heavy-duty centrifugal pumps reputed for their dependable, trouble-free operation; the Goulds Fig. 3189 Series offers you:

Versatility — You can use the Fig. 3189 single-stage, open impeller pumps for general water service, irrigation, circulation, slurries, transfer, factory wastes and for air conditioning. You can choose just the right pump for your need from 10 sizes with capacities ranging up to 1080 gallons per minute, with heads up to 180 feet at 1750 RPM.

Economy — The Fig. 3189 Series is made in the Goulds tradition—they're built to work hard and to last long. Their design accommodates wide interchangeability of parts, greatly reducing parts inventory requirements where many pumps are used.

Low Operating Cost — Modern hydraulic design provides high operating efficiency with relatively low power consumption. Impellers are statically and hydraulically balanced for smooth operation.

Operating Convenience — You can adapt the Fig. 3189 pump to various piping arrangements by swiveling the discharge nozzle to any one of three positions.

Maintenance Convenience — Wide openings in the support head give ready access to gland and stuffing box. Bearing housing is completely sealed to exclude moisture and dirt. *You can safely use the unit outdoors without fear of dirt harming the bearings and you can hose it down without fear of water damage.*

For specifications, performance curves and other interesting design details that contribute to long, economical service, send for illustrated Bulletin 720.4.

MEMBER

Goulds PUMPS INC. Seneca Falls New York

ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK
PHILADELPHIA • PITTSBURGH • TULSA

to justify the reduced price, or to look out the window on items such as depreciation and overhead, and by cutting the rig maintenance cost.

We find that many contractors are fooling themselves on overhead by placing overhead of drilling rigs against their production or other departments. Others are not allowing proper depreciation to replace equipment they are wearing out. Many are cutting down their rig maintenance cost by actually letting things go that should be repaired, thus allowing equipment to deteriorate to a junky and unsafe condition . . .

J. V. Boxell
Calvert Drilling, Inc.
Olney, Ill.

Claims Gas Rates Would Jump

"If the oil and gas lobby prevail in their selfish efforts to destroy public rate regulation, Cleveland's gas rates may well be expected to rise almost 100 per cent within a 5-year period.

"We have enjoyed relatively low rates principally because of the protection afforded by the Natural Gas Act, which the oil and gas lobbies now seek to destroy."

Rep. Vanik of Ohio in introducing a bill in Congress directing the Federal Power Commission to regulate the price of natural gas going into interstate commerce.

Independent Backs Tariff

"Opposition to limiting petroleum imports by a tariff which is designed simply to restore a competitive relationship between domestic and foreign production cannot soundly be based upon the contention that such a policy conflicts with the 'trade-not-aid' aims of our allies.

"Oil, unlike most other commodities brought to our shores, is imported by American companies. Our allies, therefore, are not the principal beneficiaries of our . . . mounting imports of low-cost foreign oil . . . Source countries receive no more than 50 per cent of the net profits shown on these companies' books for their production operations abroad . . ."

R. L. Foree, Dallas independent, in appearing before the House ways and means committee during a hearing on the Trade Agreements Act.

Foreign Trade Advocate

"It is clear that the United States cannot hope for enlargement of its own foreign trade unless we as a nation help to create conditions in which other countries are able in turn to enlarge their own trade . . .

"It is The Texas Co.'s opinion that this legislation deserves the support of

read why

RAYFLO

is a better Mud Dispersant

RAYFLO is a new silvichemical made to rigid and consistent standards. It is a dark, reddish brown powder—made from the bark of the Western Hemlock Tree. This new product of Silvichemistry cuts drilling mud costs and opens up many new advantages to tool pushers, contractors and operators.

check these facts:

RAYFLO is water soluble. No need to dissolve it in caustic soda first.

RAYFLO is completely effective under conditions of low sodium alkalinity.

RAYFLO permits smooth breakover when converting from a sodium base to a lime base mud.

RAYFLO is an excellent oil emulsion stabilizer.

RAYFLO is uniform. Every batch is consistent—one bag is just like another.

RAYFLO is a domestic product. This means Rayflo is not subject to the uncertainties of foreign conditions.

Who makes Rayflo? Rayflo is made by Rayonier Incorporated, one of the world's leading suppliers of high grade chemical cellulose for a broad variety of industrial uses. Rayonier has pioneered in the new world of silvichemistry and produces Rayflo under rigid technical control. There's no guesswork about a single bag of Rayflo! Rayflo is the registered trademark of Rayonier Incorporated.

RAYONIER
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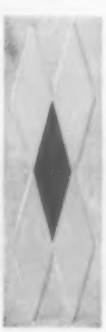


Rayflo is available now! You can get Rayflo from your present supplier or—The Macco Corporation Drilling Fluid Division, 14,409 South Paramount Blvd., Paramount, Calif.; Milwhite Mud Sales Company, 1092 M & M Building, Houston 2, Texas. If you wish a sample of Rayflo, write to Rayonier Incorporated, 161 East 42nd St., New York 17, N. Y., Dept. 10-D.

cellulose chemistry

Executive and General Sales Offices:
161 East 42nd St., New York 17, N. Y.

Read gas flow totals directly!

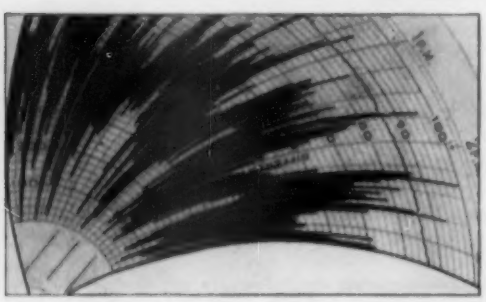
. . . with the Foxboro G. P. I.*

*Gas Powered Integrator

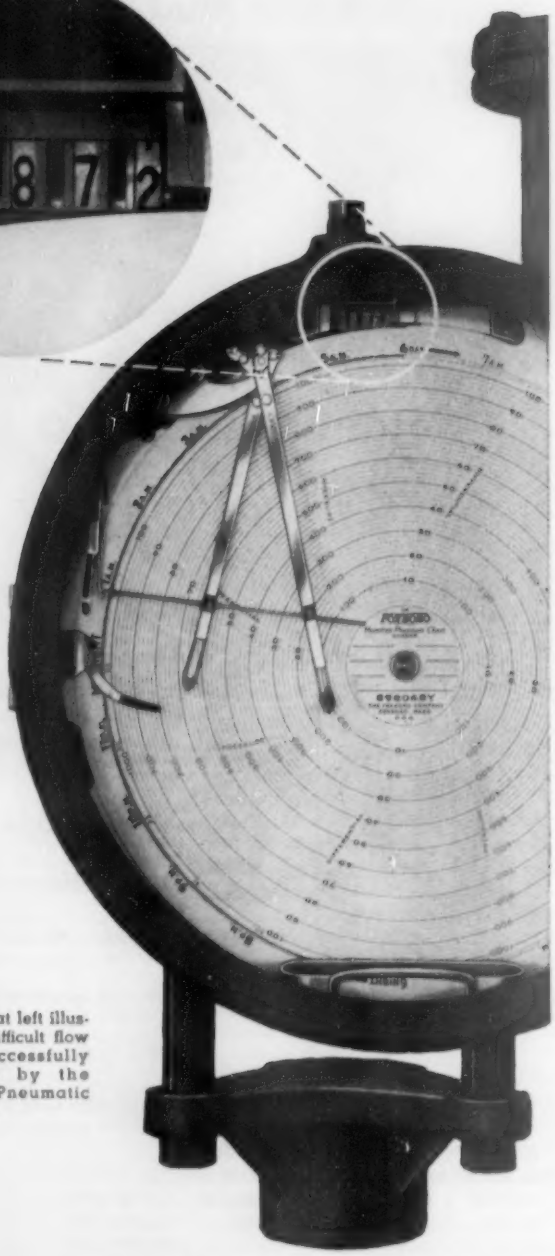
- *Automatically totalizes rapidly varying flows*
- *Eliminates planimetering*
- *Requires no electricity*

Widely-swinging flows — like intermittent gas injection and gas feed to drilling rig engines — are no problem to the Foxboro Gas-Powered Integrator! The clear-cut counter of this rugged instrument gives totals directly in flow units . . . does away with inexact, time-consuming chart calculations.

The Foxboro G.P.I. is a field-tested performer widely used by leading companies. It has proved its accuracy and dependability . . . and its low maintenance . . . time and again. Look at your flow charts. If they resemble the chart illustrated here, you need G.P.I. . . . to save time and money. Available on all types of Foxboro Flow Meters. For complete details, write for Bulletin 7-11.



The chart at left illustrates a difficult flow pattern successfully totalized by the Foxboro Pneumatic Integrator.



THE FOXBORO COMPANY, 602 NEPONSET AVE., FOXBORO, MASS., U.S.A.

FOXBORO
REG. U.S. PAT. OFF.

AUTOMATIC GAS FLOW TOTALIZING

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

the Congress as a realistic and middle-of-the-road approach to the problem of creating more favorable conditions for continued growth in international trade . . ."

James W. Foley, vice president of The Texas Co., in appearing before the House ways and means committee during a hearing on the Trade Agreements Act.

In a Strait Jacket and Slugged

"To place the natural-gas producer in a public-utility status where his prices and all his operations are subject to regulatory control is to place him in a Strait Jacket. To do so is a violation of that cardinal principle of our American system that the general welfare is best served by maximum economic freedom, subject only to the minimum regulation necessary to protect the public interest and the rights of individuals.

"At present the natural-gas producer is numb. He feels that he suddenly has been slugged over the head from behind. One cannot exaggerate the chaos and confusion that now exists in the natural gas production industry as a result of the Supreme Court decision and the subsequent action of the Federal Power Commission. The simple fact is that no producer knows where he stands today or what the future holds for his business . . ."

James E. Pew, manager, natural-gas division, Sun Oil Co., in an address before a New York meeting of the Society of Gas Lighting.

Why Phillips Case Is Wrong

"Twenty years ago . . . I was at the meeting at the home of the governor of Oklahoma with other members of my (congressional) committee and governors of oil-producing states at which the Interstate Oil Compact was born as our alternative to federal bureaucratic control of the petroleum industry. To help states enforce their own conservation laws, I voted for the Connally Hot Oil Act . . . I was also a member of that committee when it brought out and secured the passage of the Natural Gas Act of 1938 . . .

"I can assure you that it was never the intent or understanding of the proponents of the Natural Gas Act of 1938 to authorize the federal Government to fix the field price of natural gas to independent producers who were not engaged in the public utility business of the interstate transmission of gas.

"If 'the intent of the law giver is the law,' the decision of the five judges of the United States Supreme Court in the Phillips case was wrong. It was wrong both in law and in economics and must be changed in the interest

EXPANDING
with East Texas!

NEW, LARGER PLS PLANT AT LONGVIEW

Provides the Most Modern Facilities for Coating and Wrapping

Keeping pace with the needs of pipe users in the East Texas area, Pipe Line Service has built this new, larger plant on the Texas & Pacific Railroad at Longview. Here you will find the most advanced type equipment for cleaning, priming, coating and wrapping steel pipe. With 22 acres, storage space is unexcelled, and transit privileges are available on shipments from pipe mills to destinations in surrounding states. It all adds up to better service than ever—more for your money in every foot of protection you buy.

DEPENDABLE SERVICE SINCE 1931

PLS Pipe Line Service Corporation

Pioneers in Steel Pipe Protection

General Offices and Plant: Franklin Park, Illinois

Plants at Glenwillard, Penna.; Longview, Texas; Corpus Christi, Texas; Harvey, La.; Sparrows Point, Md.; and Monmouth Junction, N.J.

6 Reasons why A GAULIN TRIPLEX PUMP can make money for you . . .

1. **Horizontal design** of this hydraulic pumping unit completely separates cylinder from crankcase, preventing any product leakage to crankcase.

2. **Plexiglas well covers** give an instant visual check of cylinder plunger and packing operation.

3. **Corrosion-proof cylinder** is made of stainless. Hardened stainless or ceramic plungers available.

4. **Spring-loaded plunger packing** is self-adjusting, self-sealing, eliminating the human element.

5. **API ball valves** and removable seats permit quick adjustment in the field.

6. **Wide volume and pressure ranges** are provided by Gaulins because plunger sizes and drive speeds can be quickly changed in the field.

MANTON-GAULIN MANUFACTURING CO., INC.
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M. Les Walraven, Mgr. Oil Field Sales
(Oxford 7-6334)
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Gaulin
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Manton-Gaulin
MANUFACTURING CO., INC.
EVERETT, MASSACHUSETTS
or call: SPECIALTY SALES & SERVICE, INC.
Tulsa, Oklahoma — (Tulsa 5-4322e)
Odessa, Texas — (Odessa 6-6931)

of adequate supplies of natural gas at reasonable prices to the consumers of America . . ."

Samuel B. Pettengill, legal department, Pure Oil Co., in an address before the Evansville, Ind., meeting of the Basin Chapter, American Petroleum Institute, and the Indiana Oil and Gas Association.

Liked Our Crystal Ball

Dear Sir:

The picture on your January 31 cover is phenomenal, showing most of the oil business in one crystal. Your staff is to be congratulated.

Your Journal is the best in the entire trade publications, barring none, and I subscribe to many.

Can you furnish me a glossy print that I may have blown up for my office wall. I would like very much to have one. Please bill me for it.

J. C. Sutton
Rockford, Ill.

Editor's Note: Your glossy print is on its way, Mr. Sutton. Others who want a copy of the cover can obtain them for $1 from the Journal's Tulsa office.

CALENDAR OF EVENTS

FEBRUARY

23-24 Pacific Coast Gas Association, seminar on electronic data processing, Los Angeles.

25 National Gasoline Association of America, Permian basin regional meeting, Scharbauer Hotel, Midland, Tex.

MARCH

1-2 American Gas Association committee on natural gas reserves, Baker Hotel, Dallas.

1-2 Fourth Symposium on Subsurface Geology, University of Oklahoma School of Geology and Oklahoma Geological Survey, Oklahoma Memorial Union Building, Norman, Okla.

4 Southern Gas Association, transmission management conference, Shamrock Hotel, Houston.

7-11 National Association of Corrosion Engineers, Palmer House, Chicago.

9-11 American Petroleum Institute, Division of Production, Southwestern spring meeting, Jung Hotel, New Orleans.

17-18 Southern Gas Association, Distribution Management Conference, Jung Hotel, New Orleans.

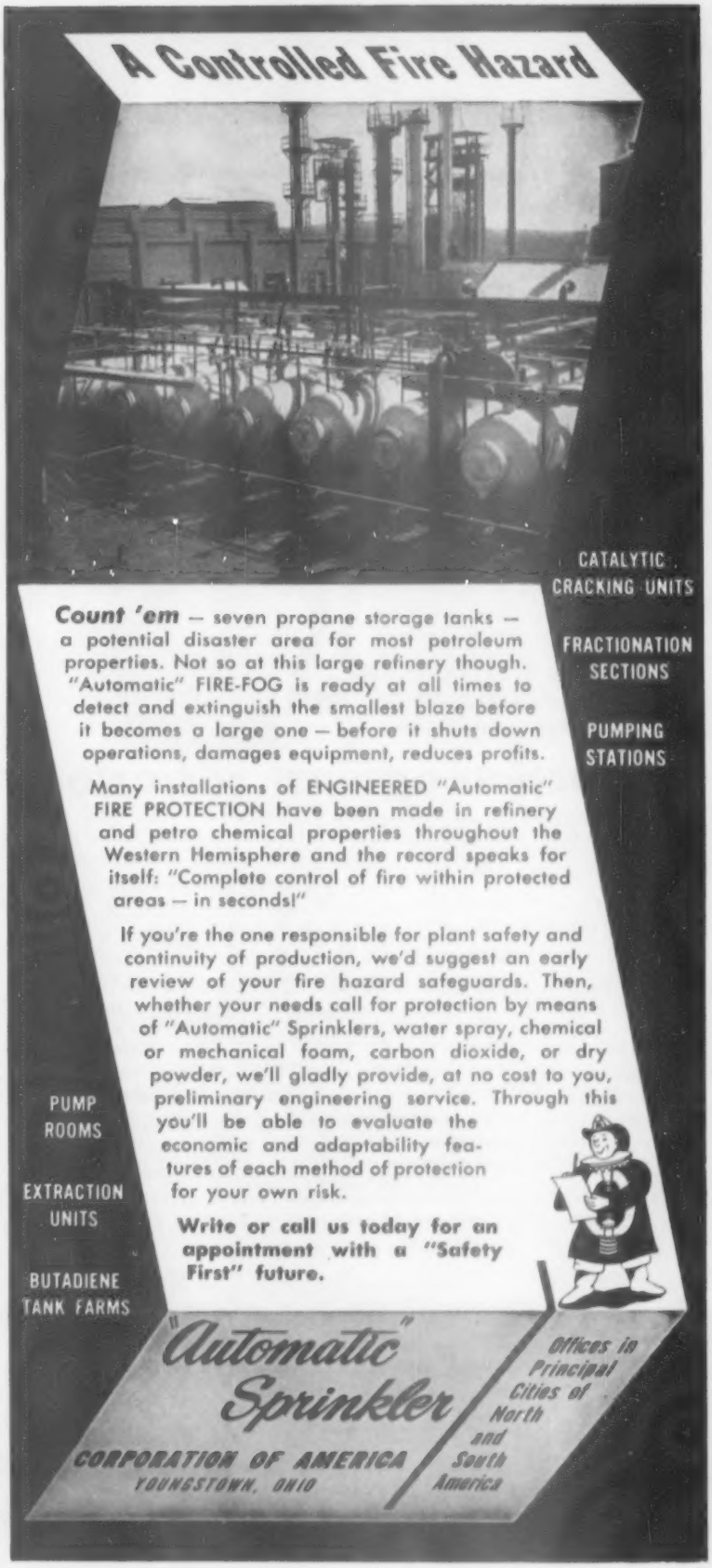
20-23 American Institute of Chemical Engineers, Kentucky Hotel, Louisville.

23-24 Pacific Coast Gas Association, accident prevention conference, Santa Barbara, Calif.

23-25 American Petroleum Institute, Division of Production, Mid-Continent District, Herring Hotel, Amarillo, Tex.

26 North Texas Oil and Gas Association twenty-fifth annual meeting, Wichita Falls, Tex.

27-29 Texas Independent Producers and


A Controlled Fire Hazard
CATALYTIC CRACKING UNITS
FRACTIONATION SECTIONS
PUMPING STATIONS
Count 'em — seven propane storage tanks — a potential disaster area for most petroleum properties. Not so at this large refinery though. "Automatic" FIRE-FOG is ready at all times to detect and extinguish the smallest blaze before it becomes a large one — before it shuts down operations, damages equipment, reduces profits.
Many installations of ENGINEERED "Automatic" FIRE PROTECTION have been made in refinery and petro chemical properties throughout the Western Hemisphere and the record speaks for itself: "Complete control of fire within protected areas — in seconds!"
If you're the one responsible for plant safety and continuity of production, we'd suggest an early review of your fire hazard safeguards. Then, whether your needs call for protection by means of "Automatic" Sprinklers, water spray, chemical or mechanical foam, carbon dioxide, or dry powder, we'll gladly provide, at no cost to you, preliminary engineering service. Through this you'll be able to evaluate the economic and adaptability features of each method of protection for your own risk.
Write or call us today for an appointment with a "Safety First" future.
PUMP ROOMS
EXTRACTION UNITS
BUTADIENE TANK FARMS
"Automatic" Sprinkler
CORPORATION OF AMERICA
YOUNGSTOWN, OHIO
Offices in Principal Cities of North and South America

for extra

protection against corrosion

NOW used in both sweet and sour corrosive wells in Arkansas, Louisiana, Mississippi, Kansas, Oklahoma, Texas, New Mexico and California, new Nocor "103" is cutting corrosion costs to a minimum.

Major users have begun to standardize on Nocor "103" because *in their own comparative tests they found Nocor "103" most effective.* Our files include reports of cases where the concentrated strength and dispersibility of Nocor "103" proved three to four times as effective as its two nearest competitors. In addition, both competitive inhibitors are priced at higher prices, by volume, than Nocor "103".

You get extra protection with Nocor "103". Available in both liquid and stick form.

Nocor "103" is fully described in Cardinal's newest publication. Write for your copy today.

CARDINAL CHEMICAL · INC.

Home Office Odessa, Texas P. O. Box 2049

Royalty Owners Association, ninth annual meeting, Hotel Texas, Fort Worth.

28-30 Western Petroleum Refiners Association, 43rd annual meeting, Plaza Hotel, San Antonio.

28-31 American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Exploration Paleontologists and Mineralogists, annual meeting, Hotel Statler, New York.

28-April 1 American Society for Metals, 9th western exposition and congress, Pan American Auditorium, Los Angeles.

30-April 1 17th annual American Power Conference, sponsored by Illinois Institute of Technology, Sherman Hotel, Chicago.

APRIL

4-5 Wilcox Trend Symposium, Eighth Oil Recovery Conference, Texas Petroleum Research Committee, Texas A. & M. College, College Station, Tex.

5-7 Corrosion control short course, sponsored by University of Oklahoma and Central Oklahoma Section of National Association of Corrosion Engineers, University of Oklahoma Extension Study Center, Norman, Okla.

7-8 Rocky Mountain District, American Petroleum Institute, Division of Production, Gladstone Hotel, Casper, Wyo.

13-15 Natural Gasoline Association of America, annual convention, Baker and Adolphus hotels, Dallas.

13-15 American Society of Lubrication Engineers, tenth annual meeting, Hotel Sherman, Chicago.

13-15 National Petroleum Association, 52nd semiannual meeting, Cleveland Hotel, Cleveland.

18-20 American Society of Mechanical Engineers, spring meeting, Lord Baltimore Hotel, Baltimore.

19-20 Pacific Coast Gas Association, distribution conference, Phoenix.

19-21 Southwestern Gas Measurement Short Course, North Campus, University of Oklahoma, Norman, Okla.

20 American Society for Testing Materials —DCC, Kansas regional group meeting, Broadview Hotel, Wichita, Kans.

20-22 Petroleum Industry Electrical Association, annual conference, Shamrock Hotel, Houston.

24-27 American Society of Mechanical Engineers, Region VIII engineering conference, Rice Hotel, Houston.

25-26 Independent Petroleum Association of America, midyear meeting, San Antonio.

28-29 American Petroleum Institute, Division of Production, spring meeting of Pacific Coast district, Statler Hotel, Los Angeles.

29-30 American Association of Petroleum Landmen convention, Hilton Hotel, Fort Worth.

MAY

1-4 Liquefied Petroleum Gas Association, annual convention, Conrad Hilton Hotel, Chicago.

1-4 American Institute of Chemical Engineers, Shamrock Hotel, Houston.

9-10 American Gas Association, Gas Supply, Transmission and Storage Conference, Hotel William Penn, Pittsburgh.

9-12 American Petroleum Institute, Division of Refining, midyear meeting, Jefferson Hotel, St. Louis.

11-12 Pacific Coast Gas Association, gas sup-

ply and transmission and conference of technical session, Palm Springs, Calif.

11-13 American Petroleum Institute, Division of Production, Eastern District spring meeting, William Penn Hotel, Pittsburgh.

12-13 Sixth Symposium, "Automation—Engineering for Tomorrow," School of Engineering, Michigan State College, East Lansing, Mich.

12-19 Sixth Latin American Congress of Chemistry, Caracas, Venezuela.

14-22 World Wide Chemical Plant and Equipment Exposition and Congress, Frankfurt, Germany.

16-18 American Petroleum Institute, Division of Transportation, products pipeline confrence, Edgewater Beach Hotel, Chicago.

16-18 Southern Gas Association, New Orleans.

20-22 Appalachian Geological Society, Virginia Geological Survey, and West Virginia Geological Survey, spring field conference, Kavannaugh Hotel, Harrisonburg, Va.

23-25 American Petroleum Institute, Division of Marketing, midyear meeting, Chase and Park Plaza hotels, St. Louis.

26-27 Western Petroleum Refiners Association, technical-industrial relations meeting, Settles Hotel, Big Spring, Tex.

26-27 Kentucky Oil and Gas Association, annual meeting, Lafayette Hotel, Lexington.

30-June 1 Chemical Institute of Canada, thirty-eighth annual conference and exhibition, Quebec City, Que.

JUNE

1-3 Tenth annual Short Course on Gas Technology, Texas College of Arts and Industries, Kingsville, Tex.

5-9 Canadian Gas Association, annual meeting, Sheraton-Broeck Hotel, Niagara Falls, Ont.

6-9 Oil and Gas Power Division, American Society of Mechanical Engineers, 27th annual conference and engineering exhibit, Hotel Statler, Washington, D. C.

6-10 American Petroleum Institute, Division of Production, midyear committee conference, Brown Palace Hotel, Denver.

6-15 Fourth World Petroleum Congress, Rome, Italy.

9-10 Natural Gas and Petroleum Association of Canada, Royal Connaught Hotel, Hamilton, Ont.

9-10 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

11-15 Petroleum Equipment Suppliers Association, annual meeting, Banff Springs Hotel, Banff, Alberta, Canada.

12-17 Society of Automotive Engineers, golden anniversary summer meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

16-18 Interstate Oil Compact Commission, Cosmopolitan Hotel, Denver.

20-23 American Society of Mechanical Engineers, semiannual meeting, Statler Hotel, Boston.

23-24 Western Petroleum Refiners Association, technical-industrial relations meeting, Broadview Hotel, Wichita, Kans.

23-26 Rocky Mountain Oil Show, Casper, Wyo.

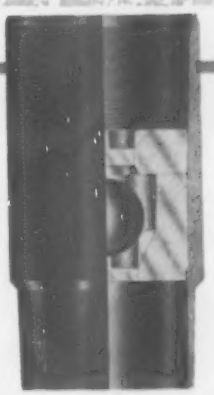
26-July 1 American Society for Testing Materials, Chalfonte-Hadden Hall, Atlantic City, N. J.

AUGUST

15-17 Society of Automotive Engineers, golden anniversary West Coast meeting, Hotel Multnomah, Portland, Ore.

RECTOR

ALL METAL Casing Shoes and Collars give you THREE Important NEW Advantages!



TYPE "A" FLOAT COLLAR TYPE "A" FLOAT SHOE

1. GREATER STRENGTH: Aluminum alloy internal parts have far greater impact, compression, tensile and shear strength than cement or bakelite.

2. PRECISION CEMENTING: Being all metal, they can be precision machined and ground to close tolerances for precision performance.

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• These new Rector Type "A" cementing shoes and collars have internal parts of a special aluminum alloy that combines strength, abrasion resistance and drillability. The bodies are precision machined from high quality seamless steel—internal aluminum alloy parts are machined and ground to close tolerances.

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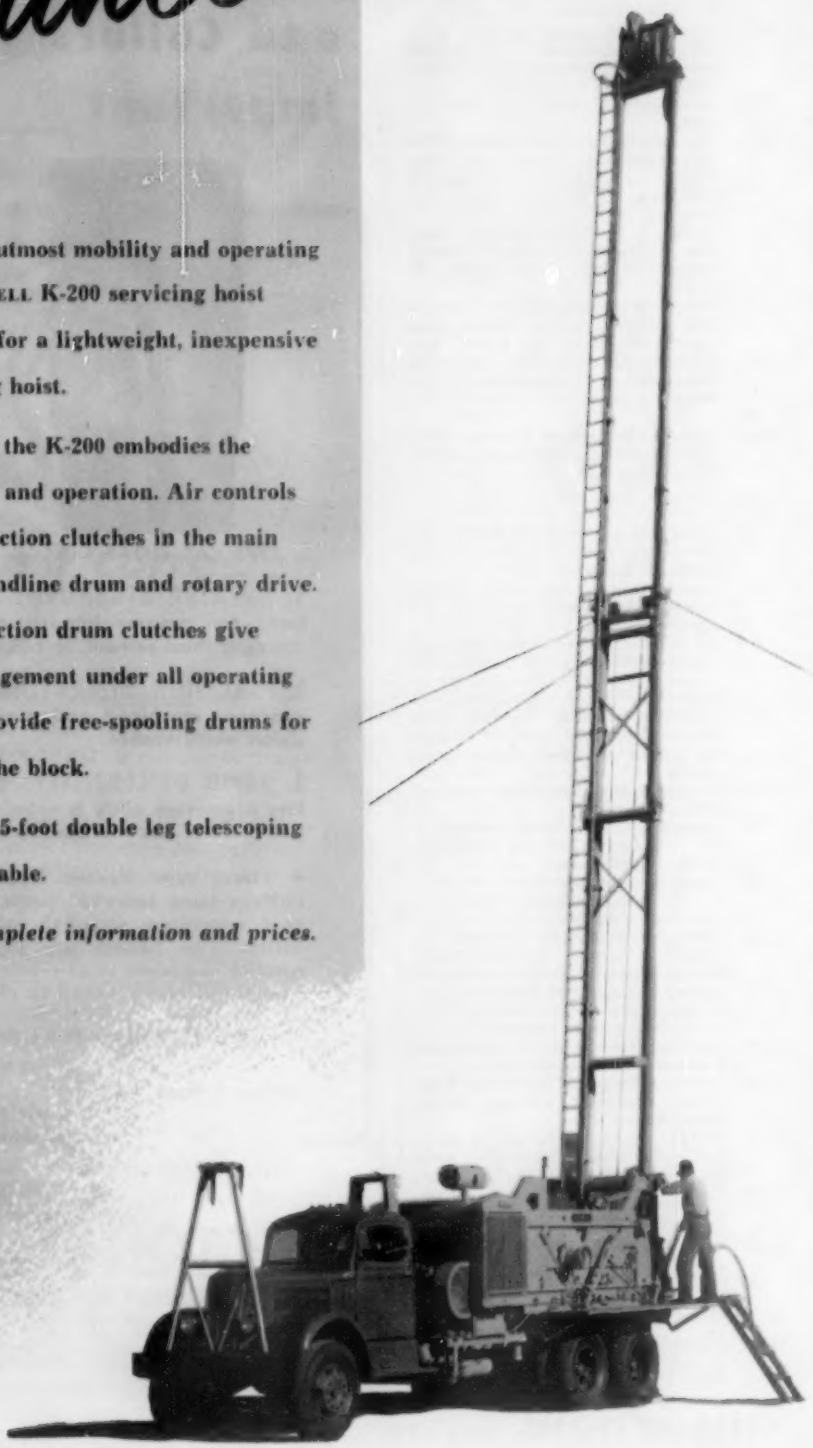
Designed for utmost mobility and operating speed, the CARDWELL K-200 servicing hoist meets your needs for a lightweight, inexpensive 200-H. P. servicing hoist.

The design of the K-200 embodies the simplest of design and operation. Air controls operate the air friction clutches in the main drum, optional sandline drum and rotary drive. CARDWELL air friction drum clutches give fast, positive engagement under all operating conditions and provide free-spooling drums for fast dropping of the block.

A 65-foot or 55-foot double leg telescoping pipe mast is available.

Write for complete information and prices.



K-200 *Servicing Hoist*

FEATURES

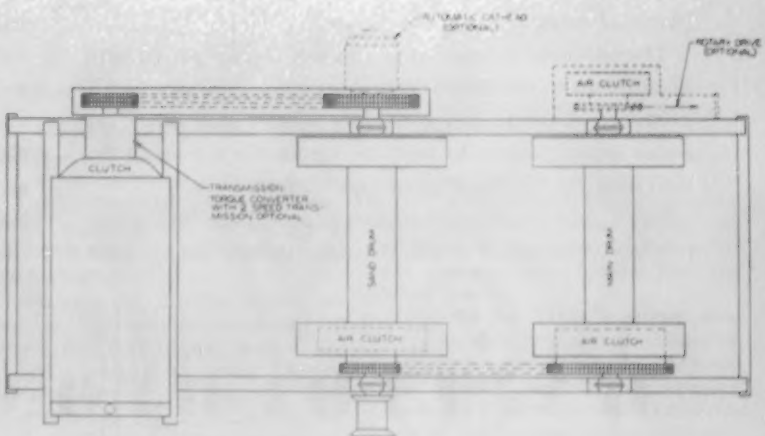
CARDWELL air friction clutches in main drum, optional sandline drum and rotary drive.

Transmission provides four-speeds forward and one reverse to both drums.

Free-spooling drums, mounted on double row, self-aligning bearings.

65-foot or 55-foot double leg mast telescopes and folds over the hoist. Mast is raised and extended by line from winch which is driven by truck engine.

K-200 is available with GM 6031-C or Waukesha 145GKU engine, and can be mounted on a WC-2264 White, RF-195 International or 800-Ford truck.



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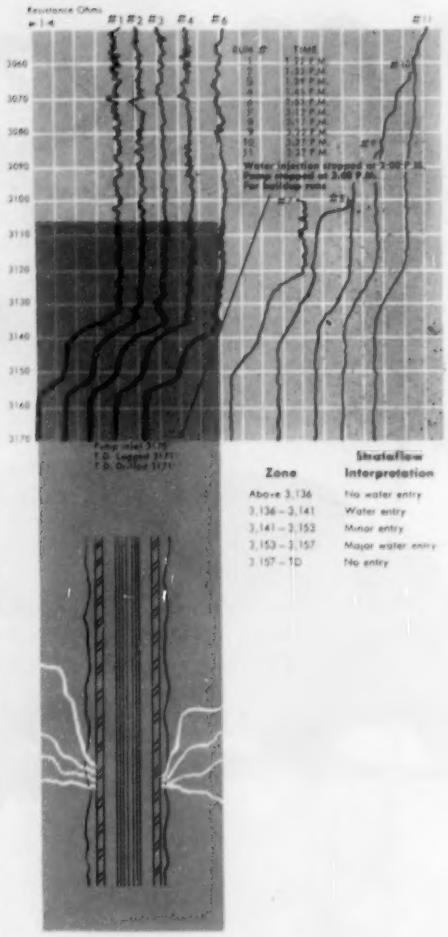

HALLIBURTON'S STRATAFLOW LOGS DURING NORMAL PRODUCTION

Water production in a pumping well—with increased costs of lifting, disposal and corrosion—can seriously endanger profitable production. Halliburton's Strataflow Log, the only method for locating major and minor zones of water entry in *any producing well*, provides the first step in an effective workover program designed to shut off water—and step up production!

Wells with a low or moderate productivity index, wells completed in limestone or dolomitic formations and even wells producing hydrogen sulphide can be accurately and economically logged with the Strataflow technique. The Strataflow measuring electrode, small enough to run in the annulus, measures the difference in resistivity between formation waters and a conditioning fluid, usually fresh water that is introduced into the bore. The data is recorded as a continuous log that allows easy interpretation of points of entry and relative volumes of water.

The complete survey can be run in a 24 hour period with about eight to ten hours of working time. And the well is produced continuously, with only a brief shut down for water consolidation. At no time during the survey is the well likely to approach static equilibrium.

You'll find the Strataflow Log can be your best guide to effective remedial work. When Strataflow data is used with modern cementing techniques, you have the perfect combination for shutting off water, for improving oil flow, and for making production more profitable. For the full story on Strataflow's accuracy and record of success, call your local or district office of the Halliburton Oil Well Cementing Company.

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TULSA, OKLAHOMA

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JOURNALLY SPEAKING . . .

Song of Texas Geologists

All rocks in Texas may yield oil because of our geology;
We've made a well in every stratum of our state's lithology.

Dame Nature did right well by us throughout the post-Cryptonic—
A fact which gives geologists a shot-in-arm-like tonic.

The little bugs that made the oil were very active—very—
Through Cambrian, Silurian, Cretaceous, Quaternary.

To find where Nature hid this oil is our devoted mission;
And if we miss the Miocene we'll hit the Ordovician.

We're devoted to Devonian, we love the Pennsylvanian,
We fuss around with Fusselman and miss the Mississippian.

We drill in limestone, sand, and shale, anhydrite and conglomerate;
Oil might not show but still we know it could be there at any rate.

Pay zones have seen Oligocene, Triassic, Cenozoic;
If Woodbine's dry we'll always try to find the Paleozoic.

From dark till dawn we watch for Strawn; we won't go home for supper
Until the cuttings indicate we've hit Cretaceous (Upper).

We know there's oil somewhere below—in fact it's our philosophy
That hydrocarbons must exist throughout our whole stratigraphy.

We study cores, examine pores, and look for salt-dome caps,
But no one knows the clue to those darn stratigraphic traps.

It's great relief to hit a reef while aiming for the Frio,
But as to why some holes are dry is what not even we know.

We may hit salt, the field may fault, we may be off formation—
But though this toil does not yield oil it adds to information.

If we don't hit we're not one whit dissuaded from our solemn
Opinion that there's oil throughout the sedimentary column.

Oil from All Ages

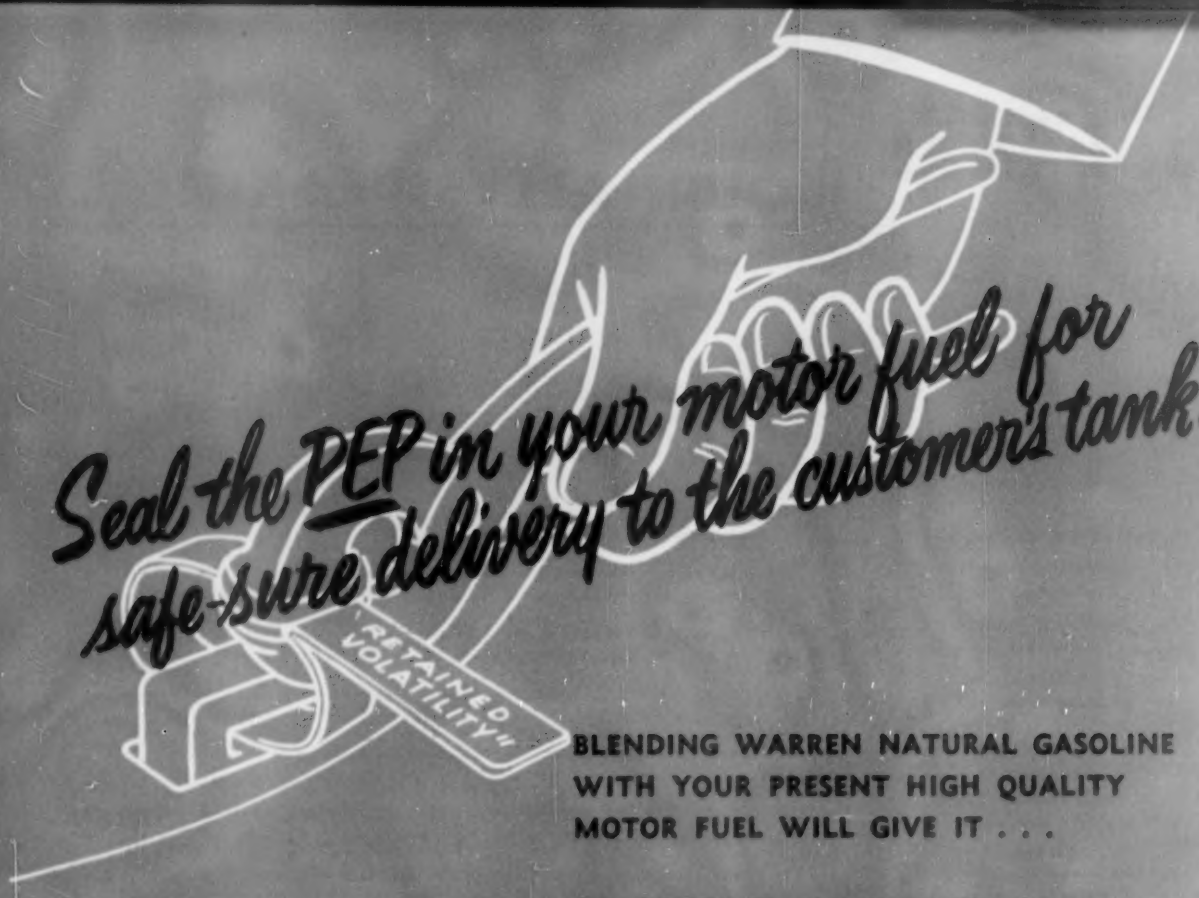
THE above literary gem was inspired by reading "Texas . . . Oil from All the Ages" by our own Dr. Frank Gardner. For confirmation of the theme—and for much greater accuracy—we recommend that you read the article, starting on page 107.

Frank says our rhyming efforts resulted in considerable distortion of geology, but that doesn't bother us. *We* didn't criticize *his* article. Every man to his trade, say we. We were simply following the injunction of the poet (a real poet) to "find sermons in stones, songs in the running brook." So we find poems in the Texas rocks where geologists find nothing but oil (or nothing period).

But, on the other hand, where we found nothing but doggerel in Frank's piece, we're confident that geologists will find plenty of good dope. And if they don't find it there, they surely will in the "County Correlator for Texas Oil," a red-white-and-blue wall chart which you'll find tucked in between the pages of this issue (unless somebody else saw your Journal first and swiped it out).

To make this Texas meal complete, there's another very special feature—a report on the state's reserves just completed by the Texas Petroleum Research Committee. This monumental study was years in the making, and we wangled a copy just as the last page left the typewriter and rushed it into print. Usual Journal service. You can read all about it on page 115.

—*Henry D Ralph.*



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If gas producers don't hang together, they'll hang separately

DISSENSION, suspicion, and misunderstanding threaten to keep gas producers from uniting on legislation to get the Federal Power Commission out of their business.

Quite a few smaller producers and royalty owners are so mad at certain pipelines, processors, and large operators who buy and resell gas that they are in a mood to welcome FPC control.

They think that FPC would straighten out their grievances—real or imaginary—and bring more orderliness, justice, and uniformity to the gas business. Or that in any event, things couldn't possibly be worse for them under federal regulation than they are now. And that the big operators have had the whip hand too long and ought to be cut down to size by some regulatory agency.

Some of them are hinting that they may go to Washington and tell Congress just that.

THIS IS A SORE-HEADED, SHORT-SIGHTED ATTITUDE. Now there may be good reasons why heads are sore. Some of the big operators may have handed the little fellows the dirty end of the stick. Or perhaps poor public relations has permitted this feeling to build up. Quite likely many royalty, operating, and purchase contracts do contain some inequities. If so, those at fault should take quick steps to mend their fences.

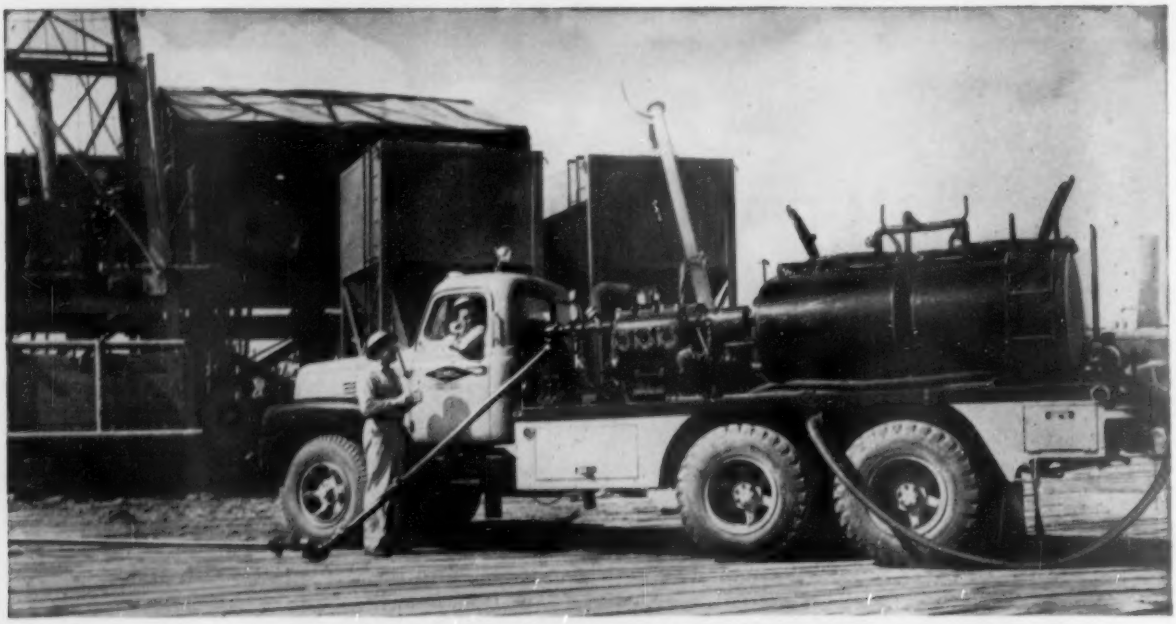
But it is short sighted to think that federal regulation would be any better. The chief advocates of federal control have just one objective: lower gas bills for consumers. They think the best way to do this is to force down field prices of producers. And to them, "producers" means big operators, small operators, royalty owners, "oil-rich millionaires," the whole Southwest.

The only way that federal regulation will correct present inequities is to pull everybody down to the level of the lowest.

TO SUPPOSE THAT FPC WILL CONCERN ITSELF with the troubles of small operators is wishful thinking. Consider just one example: Farmers complain that they can't get their own royalty gas for irrigation. Would FPC care? Right now FPC is forcing producers to violate orders of the Texas Railroad Commission to inject gas into the reservoir to produce more oil. FPC reflects the attitude of eastern consumers that the gas belongs to them regardless of local needs and conditions.

Swapping the present situation, no matter what its faults, for federal control would be jumping from the frying pan into the fire.

Everybody concerned with gas production should realize this. The bigger operators should make sure that everybody does. And they should also see to it that their own practices don't alienate needed allies.



Dowell engineers use the latest treating techniques, specially designed tools and high-pressure, high-volume pumping equipment.

MUD CAKE REMOVED

Dowell Mud Acid treatment increased well potential 126 bbls. oil per day

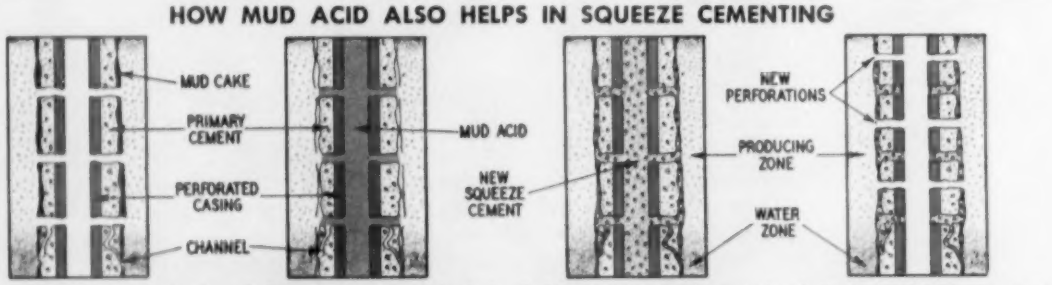
A well had shown good oil saturation, but failed to produce when completed. The operator believed that mud and mud cake on the screen, perforations and the face of the pay was restricting oil flow. Dowell engineers, called on the job, recommended Mud Acid. Following the treatment, the well's potential was 126 BOPD, flowing.

Mud Acid is a special acid solution designed to dissolve clay minerals and destroy the swelling and colloidal properties of bentonitic materials — such as found in drilling mud. It is used to restore and increase permeability of critical zone at well bore, to clean liners, screens, perforations and the formation face.

Mud Acid is also used to free stuck drill pipe; to spearhead fracture treatments; to clean gravel packs; to increase capacities; and to reduce injection pressures of gas and water input wells.

Call the nearest station today for full details on Mud Acid and the many other Dowell oil field services. Or write to DOWELL INCORPORATED, Tulsa 1, Oklahoma, Dept. B-11.

HOW MUD ACID ALSO HELPS IN SQUEEZE CEMENTING



1. Incomplete removal of mud cake produced a poor cement job. This mud may break down, permitting water or gas to enter well.

2. Dowell Mud Acid (used ahead of squeeze job) removed mud cake, cleaned oil cement surfaces, exposed clean formation.

3. Following Mud Acid wash, squeezed cement penetrated open spaces . . . formed a good bond with the formation and casing.

4. Here is the well after excess cement had been drilled out and casing re-perforated. In this way, producing zone was isolated.

services for the oil industry

DOWELL

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

THIS WEEK . . . . . IN THE NEWS

Drilling . . .

• Trend toward deeper drilling in Oklahoma should continue through 1955 unless unfavorable legislation is passed. Forecasts show operators expect to drill more than 8,000 wells in Oklahoma this year, many of them in deep fields.

• Drilling may start on a big scale off the coast of California within 2 or 3 years. A prominent West Coast geologist predicts state and federal tidelands there will be opened for leasing this year.

Regulation . . .

• The Texas Railroad Commission has been working quietly for a year rewriting the rules by which it governs drilling and production in Texas. The regulatory body has streamlined procedures, weeded out some burdensome rules, and revamped others.

• There is a distinct possibility the commission may move further toward controlling gas waste in Texas. In the future, pipelines may be forced to take all the state's casing-head gas before regular gas field production is allocated.

• The Louisiana State Mineral Board has been doing some streamlining also. It has drawn up some simple ground rules for leasing of state tracts. The whole thing is now broken down into three major steps—application, advertising, and bidding.

Exploration . . .

• Idaho may become the nation's thirty-first producing state. A wildcat near the Oregon-Idaho border is reported flowing gas from 1,442 ft. Oroco Oil & Gas Co., operator, did not reveal a gage or the producing formation.

• Nevada apparently has its second oil well. Shell recovered 6,000 ft. of 29°-gravity oil after a 2½-hour test from 6,606-78 ft.

• Utah has come up with another strike in the Four Corners area. Shell recovered gas and 40°-gravity crude on a test at 4,662-4,784 ft. The well is 5 miles southwest of last November's Desert Creek discovery.

Labor . . .

• Oil workers may strike this spring. O.W.I.U. policy committee will take a close look at the union's general bargaining plans 2 days before a C.I.O. convention next week. The policymakers will meet again after the O.W.I.U. merger with the Chemical Workers is completed. If O. A. (Jack) Knight, O.W.I.U. president, controls the merged union, the strike could include the joint 225,000-man membership.

International . . .

• Latin America's refining industry soon will join the trend toward use of catalytic reforming. First modern reformer unit in the region will go on stream this spring at Creole's Amuay refinery in western Venezuela.

• Second large refinery goes on stream in India. The 40,000-bbl. Burmah-Shell plant, under construction for 2 years, is largest in India.

• Arabian American Oil Co. has set a new depth record of 12,789 ft. in Saudi Arabia. The remote wildcat—dry so far—is at the northern edge of the vast desert in southeastern Saudi Arabia.

Imports . . .

• Oil imports from February through April will be 18 per cent above the average for the same period last year, according to the Independent Petroleum Association of America. The I.P.A.A., spearheading the fight in Congress for restrictions on imported oil, predicts an average of 1,250,000 bbl. daily will come into this country in next few months.

• Opposite side in the imports fight is taken by H. J. Barton, Bureau of Mines official. Speaking at an A.I.M.E. meeting in Chicago, the government spokesman pointed out that petroleum imports have enabled this country to build up its proved reserves.

Industry . . .

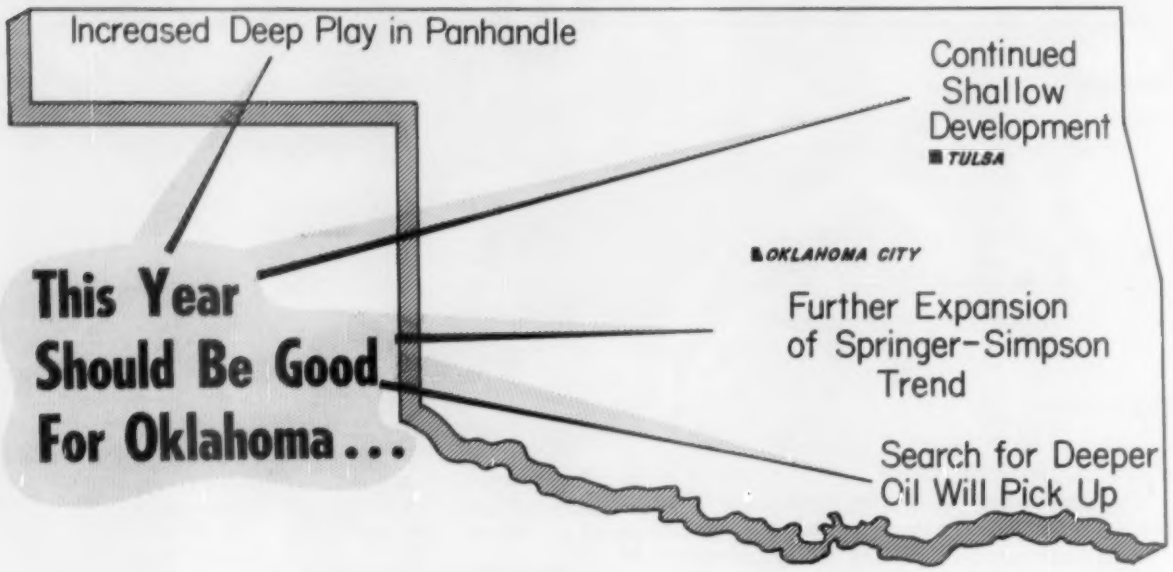
• Two Oklahoma purchasers have started pipeline proration as result of increased crude production in the state.

• A.I.M.E. will change its name to include "Petroleum". Charter details are being cleared up to make the change.

Canada . . .

• By 1960, western Canada should have a potential production of a million barrels daily, Imperial Oil official tells A.I.M.E. meeting. This will be about twice the amount of crude that can be sold in Canada in face of imports.

• An ammonia boom may be blooming in Canada. Quebec Ammonia plans a 125-ton daily plant near Montreal. Four other plants are under consideration. Heavy fuel oil and reformer hydrogen will provide the raw stocks. Natural gas may enter the picture when Trans-Canada pipeline is completed.


Increased Deep Play in Panhandle
Continued Shallow Development
TULSA
OKLAHOMA CITY
This Year Should Be Good For Oklahoma...
Further Expansion of Springer-Simpson Trend
Search for Deeper Oil Will Pick Up

. . . unless new state laws curb deep drilling

Norman Morrisey and John C. McCaslin

TULSA.—The year 1955 can be a bright one in Oklahoma.

It will be almost as good a drilling year as 1954, unless new state laws reverse the trend to deeper drilling in the state.

Oklahoma operators drilled 8,786 wells last year, an increase of 16 per cent over 1953. This drilling will continue in 1955 and at only a slightly lower level. Forecasts show operators plan to drill 8,383 Oklahoma wells this year, only 403 less than in 1954.

The Oklahoma Legislature could change this picture pretty radically in the next few months by penalizing deeper drilling. Much of 1954's drilling was in shallow areas and aimed at sands above 3,500 ft. The average depth of wells drilled was only 3,553 ft. The national average was 4,061 ft. Oklahoma's 1954 figure compares favorably with its 1953 average of 3,440 ft., but it indicates that operators were concentrating on shallow drilling areas. The drilling risks are not great; costs are low; and there are multiple pay zones that insure a reasonable chance of success in a wildcat.

Developments late in the year and early in 1955 point to more deeper drilling in Oklahoma.

This trend, however, could be reversed sharply by unfavorable legislation.

Gov. Raymond Gary favors passage of a bill which sets a minimum allowable of 25 bbl. daily per well. The governor's effort to boost allowables is part of his determined drive to give Oklahoma a larger share in the oil market. His theory is that the state will continue to produce less and other states and foreign oil will absorb more of the market as long as Oklahoma curtails production.

The catch in the proposed bill is that this 25-bbl. allowable would be set on a lease basis. A five-well lease with one good well and four strippers would be allowed to make 125 bbl. daily. The same lease might make only 45 bbl. or less on a daily allowable of 25 bbl. per day per well.

The bill would favor shallow drilling, but discourage deeper plays.

With allowables cut as much as 200 bbl. daily, deep wells face abnormally long payouts. Deep wells now take 5 to 6 years to pay out, or even longer. The same wells paid for themselves in only 2 or 3 years a few years ago.

Two of the three most promising areas in Oklahoma are the scenes of deeper probing. The third is northeastern Oklahoma where shallow drilling has already reached a peak. It could go higher if the state places a premium on shallow drilling. In the Panhandle and in southern Oklahoma the emphasis is on deeper drilling.

Deep Springer play . . . Garvin and Grady counties are still the state's most active areas with 119 active operations. The deep Springer production is expanding and estimated reserves already have passed the 100-million-bbl. mark. This trend should grow during 1955. Oil companies, faced with expiring leases, must drill or process their acreage by farmouts.

Bonus prices in Grady County have risen in 18 months from about $20 an acre to $50-$100. Almost 80 per cent of the county is under lease, with many leases expiring in 1955 and 1956. This will insure continued drilling at a high level, because the cost of renewal of this "hot" trend will be almost prohibitive.

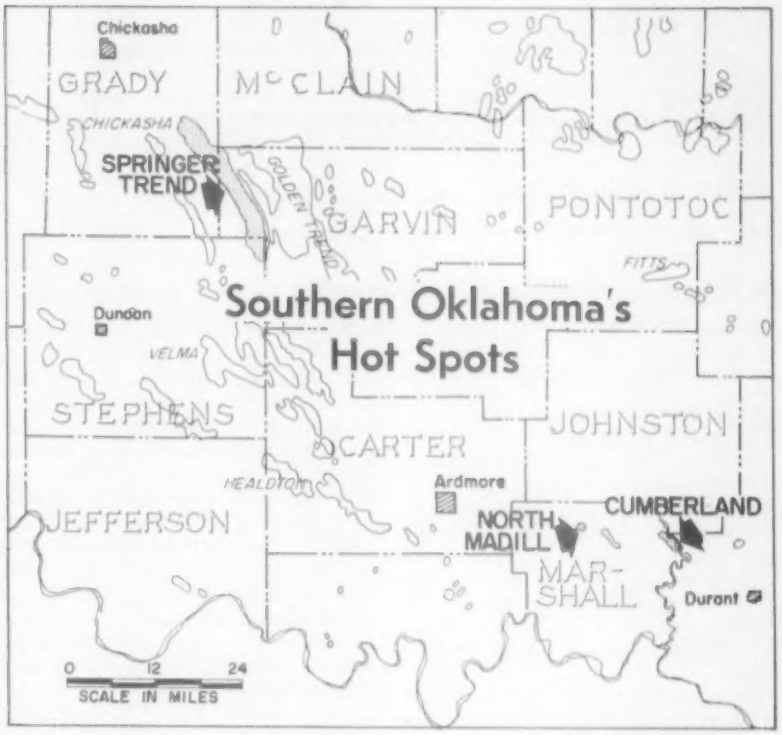
Operators are starting to explore the deeper Simpson sands along the Springer trend at 12,000-14,000 ft.—and with considerable success. Phillips Petroleum Co. 1 Steve discovery last year aroused interest in these rich sands and several wells have been completed in the Bradley area from these sands.

North Madill . . . Perhaps the most significant discovery last year in Oklahoma was the North Madill field, opened by Sinclair Oil & Gas Co. in late December in Marshall County.

The discovery well found 10 separate pay zones. It was completed in the basal McLish for 810 bbl. of oil in 14 hours. Several recent wells have confirmed this multipay field. Southern

Oklahoma operators hope it will be a second "Cumberland," a prolific Simpson pool 10 miles east of North Madill.

The question is how large is the producing area? Are there other similar structures in southern Oklahoma? The Simpson sands occur between 5,500 and 7,500 ft. at North Madill, and both majors and independents are active along the trend. The strike ignited a hot lease play with royalty prices quickly soaring to $1,000-$1,500 per acre. Leases 5 miles from the discovery command $200 an acre.



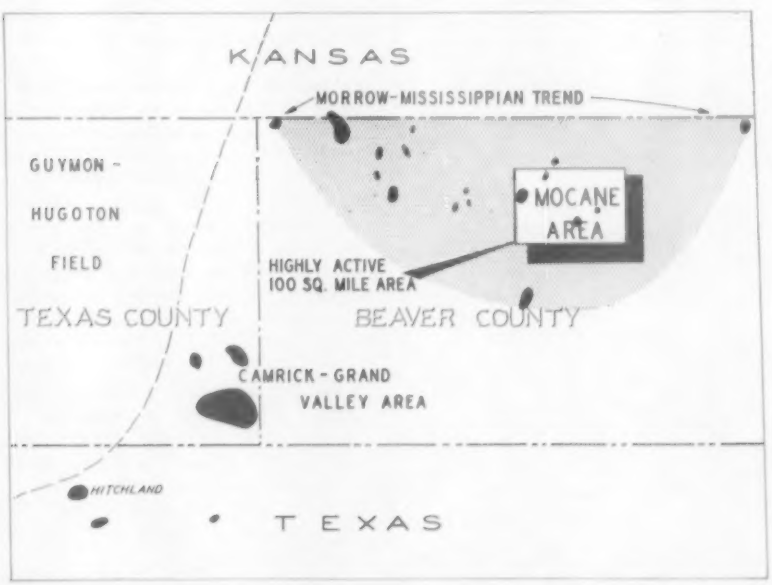
Northeast Oklahoma . . . Governor Gary's legislation would cause renewed interest in the shallow Pennsylvanian sands. An insured allowable of 25 bbl. per day per well on a lease basis will mean a fast payout for wells in this section of Oklahoma. These 3,500-ft. wells would pay out in less than 2 years, making these ventures very attractive for risk capital. This contrasts with a 5-6-year payout on deep wells in the southern part of the state where the risks are considerably greater.

Interest in northeastern Oklahoma, although still high, has reached its peak temporarily. There may well be an upswing if the present state government puts through proposed legislation.

The Panhandle . . . For years development of the vast reserves of the Hugoton gas field dominated Panhandle drilling. The Permian-Chase group, principal target, lies above 3,000 ft.; few wells were drilled below that depth.

Now, the picture has changed and deeper pays 3,000-7,000 ft. are the target. A successful exploratory campaign in 1954 had 20 wildcats completed with a success ratio of 57 per cent.

Texas and Beaver counties rated first and second in Oklahoma's portion of the Hugoton embayment in 1954. Development drilling will keynote Texas County's 1955 activity, while exploration will increase Beaver's standing.



THE MORROW-MISSISSIPPIAN trend covers the entire upper half of Beaver County, stretching from corner to corner. The fastest-growing Oklahoma Panhandle field is at Camrick-Grand Valley in adjoining Texas County.

Prolific Camrick . . . Discovered in January 1954, Camrick field has expanded rapidly and will continue to grow in 1955. This oil and gas field now covers an area 7 miles wide and 8 miles long. Its limits have not been defined. Operators are adding new pay zones and completing long extensions.

Both gas and oil occur in Morrow sands at Camrick. Tests show that the Topeka, Lansing-Kansas City, and Toronto zones are potential pay horizons. One well had an initial potential of 150 million cubic feet of gas per day from the Morrow sand.

Grand Valley field, opened in June 1954, covers four sections with production from the Morrow sands.

Operators will continue to drill for deeper pays and to expand the Camrick-Grand Valley area.

Drilling in Beaver County outlined an apparent Morrow trend that crosses the entire county in a belt 8-12 miles wide. Recent extensive leasing means an increase in exploration drilling in Beaver County.

Fracturing has rejuvenated Oklahoma's oil industry during the past 5 years, but this type of drilling—much of it in shallow areas—has not added materially to the state's reserves. Deep drilling is necessary to find undeveloped reserves, and the outlook would be dimmed by unfavorable legislation.

Railroad Commission Rewrites Rules

- **Texas commissioners have worked quietly to streamline procedures, weed out useless rules, save wasted motion**

- **Regulatory body expands viewpoint to area or state-wide basis; more stringent control of gas production possible**

Robert J. Enright

AUSTIN.—The Texas Railroad Commission is cleaning house.

Over the past year, and so gradually it has hardly been noticed, the Texas oil and gas regulatory body has been weeding out or revamping useless and burdensome rules and procedures.

It is now becoming obvious that the commission is in the middle of rewriting the entire set of rules by which it regulates drilling and production in Texas.

Here, briefly, are the major changes made in the past year. The commission:

...Abolished hearings on applications for discovery allowables and dual completions.

...Rescinded Rule 23, which required an operator to file on Form 15 his intention of shooting or acidizing a well and on Form 16 the results of such treatment.

...Revised Rule 11 setting out procedure for filing well logs.

...Issued new form, GWT-4, for semiannual reports of shut-in pressure adjustments of gas-well potentials. This information formerly was submitted on GWT-1 which wasn't designed for this purpose.

...Set up new procedure for approval of proposed unit operations. The order specified a new form and instructed operators as to data needed.

Action essential . . . The commission's work with the broom and dust pan has been self preservation—combined with its desire to improve and simplify regulation.

Some of the changes were made to lessen confusion and eliminate delay and waste motion for both the operators and the commission.

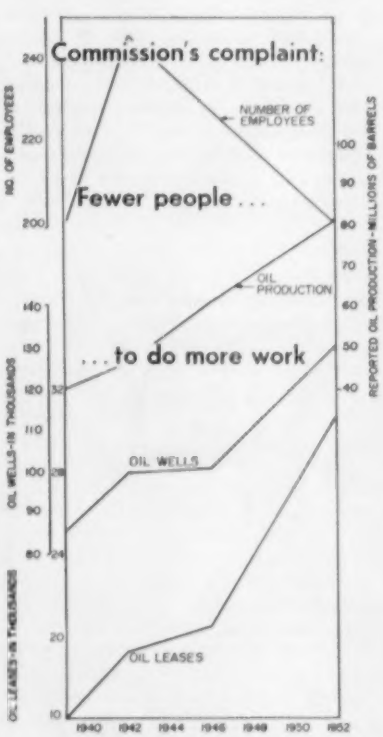
Others were made primarily to free engineers and other personnel of the commission's oil and gas division for more important work.

In both cases, commission action reflects its effort to handle a growing work load with the same number or fewer employes.

The commission labored valiantly to wangle an increase in its budget from the Texas Legislature in 1953. It presented charts showing that the number of oil and gas division employes decreased from 246 to 200 from January 1, 1942, to the first of 1952. The number of leases and oil wells in the state jumped during the same period from 19,300 to 37,000 and from 100,000 to 131,000, respectively. Oil production very nearly doubled.

The division got some help from a new machine-accounting system using punch cards. The system will be used to process and analyze monthly production reports. It will do this in a fraction of the time required before. The electronic equipment later will be used to speed up other tedious paper chores.

The machines helped, but not enough. The division was forced to take a close look at itself.



THE COMMISSION'S PROBLEM is illustrated in this chart presented before the Texas Legislature in 1953 in an effort to get more money for more help. The work load has risen steadily and the number of employes has dropped off just as steadily.

What came of it . . . Last March, Arthur Barbeck, chief engineer of the division, told the commissioners the division held 2,605 hearings in 1953, not counting spacing hearings before the commissioners themselves.

Of these, 968 or 37 per cent were on applications for discovery allowables or dual completions. Operators kicked strongly about the crowded docket. Those with dual-completion applications before the commission were usually kept up in the air with half an allowable for about a month and a half.

These hearings were held in most cases only because the rules so required. Most prudent operators submitted geological information along with the data on potential tests with their applications. Thus, the operators were repeating themselves at the actual hearing.

This was waste motion. On the recommendation of the engineers, the commission abolished the hearings and issued new application forms for discovery allowables and dual completions. Hearings now are held only on doubtful cases or where adjoining operators object. Action on an application is completed within a week of its arrival in Austin.

Likewise, the commission erased Rule 23 because it no longer served any useful purpose and wasted time and effort of division personnel. This rule, requiring an operator to report his intention to shoot or acidize a well and later to report results, was set up years ago to see if such treatment had wasteful effects of any sort. It soon became apparent that nothing bad came from shooting or acidizing, but the rule remained on the books. Now it is gone.

What may be done . . . With dual completion and discovery allowable hearings discarded, the division's biggest remaining time consumer probably is the hearing on field rules.

These, of course, can't be eliminated, but the commission may try to shorten them considerably.

More and more so-called field rules may be set up as district or state-wide rules.

This would be done where similar

conditions exist over a wide area. Field-wide rules such as those for blowout preventers, casing-cementing procedures, gas-oil ratio limits, and testing procedures may be changed to district or state-wide standards.

Blowout preventers then, for example, would be considered at a hearing on field rules only when exceptions to the general pattern came up.

This process may eventually reach a point where the only rules considered by fields would be those concerning allocation formula, MER, etc.

Then a commission engineer would spend much less time on routine phases and more on those where his talent was needed most. Volume of clerical work also would be cut.

Gas conscious . . . Further in the future but not out of sight is the possibility of more regulation of Texas gas production and gathering.

The commission in recent years has clamped down strongly on the flaring or venting of casing-head gas. It may go further in this direction.

Not so many years ago, casing-head was regarded with extreme distaste by pipeline companies. The pipelines took all the natural gas they could get to meet their requirements. If more gas was needed, they reluctantly resorted to casing-head.

This situation is no more. Pipelines are more and more inclined to take the casing-head first then fill up with gas-field gas.

This, before many years, may take the form of a state-wide rule. Pipelines may be required to take casing-head first. Casing-head production in the state would be totaled. The difference between this figure and demand would be allocated state-wide to gas fields, then by allocation formula to individual gas wells.

Area allocation . . . Another distinct possibility is that gas production may be allocated by areas rather than by fields.

Now allowables are distributed fairly between wells in a field. The Railroad Commission, however, has no control over take between fields. Because of the way gas allowables are set (on pipeline-purchaser nominations for each field), disproportionate take between fields in the same area by a pipeline is common. It works this way:

A pipeline takes gas from two fields. In the first field the pipeline owns a large portion of the production. In the second it owns none. The pipeline naturally will nominate and buy all the gas it can from the first field and fill only the rest of its need from the second. The allowable of two fields with relatively the same producing capacity can differ widely because of this.

Area allowables for gas production in Texas might be possible only because of the nature of gas transmission in Texas.

The long trunk lines with few exceptions originate in four areas and from each of these four areas carry gas the same general direction. Gulf Coast gas goes to the East for the most part. East Texas gas goes northeast to the East or the Chicago area. Permian basin gas goes west to Arizona, New Mexico, and California. Panhandle gas goes north to Midwest markets.

There are a few lines which do not fit the pattern exactly but the problems posed by these probably could be worked out. For instance, gas is piped north from the Permian basin through the Panhandle area to Midwest markets via lines of the new Permian Basin Pipeline System and its parent firm, Northern Natural Gas Co.

Crude-oil allowables of course could not be set in this way, since the state oil-transportation pattern isn't so simple. Oil from West Texas may be piped to refineries on the Gulf Coast, to plants in Missouri, Ohio, Illinois, or many other states. It also is shipped by tanker to the East Coast.

Field setup adaptable? . . . Allocation of gas by fields has many desirable features from the commission viewpoint. It probably could be made to work in allocating production by areas.

A pipeline can be forced indirectly to take gas from wells other than its own in a field and to pay a realistic price for it. This actually gives the commission what amounts to a sort of minimum-pricing power—a fact not widely known even among producers.

The key to this is the field proration formula and the nominations method of setting allowables. Unless an operator requests a hearing to set a proration formula for a new field first, the commission calls a hearing after six wells have been drilled or after 18 months, whichever is earlier. One or the other will usually take place by the time the field is connected to a pipeline or soon after.

The new field's allowable is fixed at whatever volume of gas the pipeline wishes to take from the field—up to a limit of 25 per cent of each well's open-flow potential. If the pipeline fails to take the amount nominated, however, the next month allowable is cut by the difference between the nomination and actual production.

Suppose this should happen. X has three wells in a new field and lays a pipeline to take gas from them. Y also has three wells in the six-well field. X doesn't want to take Y's gas. The commission can't order X to take the gas since gas pipelines are not common-carriers in Texas.

It can call a hearing, however, to set a proration formula and it does. The allowable then is distributed to all six wells regardless of whether or not they are connected to a pipeline. X says it needs 200,000,000 cu. ft. of gas daily from the field for January, the first month of production.

Since the allowable is distributed to all six wells, however, he can get only 100,000,000 cu. ft. or half the gas he needs. Since Y can't produce his 100,000,000 cu. ft. allowable without an outlet, this volume is deferred as an allowable credit.

The February allowable is set at only 100,000,000 cu. ft. since actual production in January was only that much. The 100,000,000 cu. ft. is distributed among all the wells, leaving X with an allowable of only 50,000,000 cu. ft. This process can go on for 6 months, with X losing allowable and Y building up allowable credit. At the end of the 6 months, Y loses his allowable credit and the process begins again. Long before the 6 months is up, however, X is hurting for gas. This is a powerful incentive for X to take gas from Y's wells.

Sometimes, X's reluctance to take Y's gas is motivated by a desire to force the latter to sell at a low price just to get an outlet for his production. The allowable-setting-and-adjusting system is a strong deterrent to such designs. X is virtually forced to pay a realistic price in order to produce his own gas.

Such an allowable system probably could be adapted to take in all fields from which a long-distance trunk line gathers gas. The volume of gas nominated by the trunk line could be distributed as allowable among the fields according to their proration formulas and their ability to produce.

The area allowable probably could be adjusted in about the same way as the field allowable. The system might involve some sort of penalty such as a field allowable credit, for taking gas over the allowable volume from one field at the expense of another.

There likely will be an uproar, especially from the pipelines, when and if the commission should set up such a system. It would be like the hubbub which resulted when the commission first started enforcing ratable gas take in Carthage field in 1943.

It is likely the commission will take no action in this direction in the near future, due perhaps to a belief that the industry is not yet ready for something of this kind.

The possibility of making the move some day is being examined in Austin.

Leases May Change

Texas Legislature may liberalize university lands

AUSTIN.—Identical bills have been introduced in the Texas House and Senate to permit extension of the primary 5-year terms of oil and gas leases on University of Texas lands.

The bills would extend the leases under these conditions:

. . . If oil or gas is being produced in paying quantities, the lease would be extended as long as production is maintained.

. . . If drilling, testing, reworking, or other such operations are being done, the lease would be extended until the work stopped. However, if oil or gas is discovered, the lease continues as long as the production does.

. . . If production should cease within 60 days of the expiration date, the lease would be extended provided reworking has been started within this 60-day period.

. . . If there are gas wells on the lease not producing because of a lack of a market, the lease could be extended for 3 years by paying twice the annual rental per year in royalty. This amount could not be less than $1,200 yearly per well.

Anyone holding a lease on University of Texas land when the bill becomes law, if passed, could have his lease amended by writing to the Commissioner of the General Land Office. The owner would also have to pay a sum equal to the annual rental as provided in the lease.

Other oil actions . . . The Texas Senate passed a bill last week giving the Texas Railroad Commission power to make and enforce rules to prevent water pollution resulting from petroleum sources.

The bill requires operators to post a $5,000 bond for one well or $10,000 for all wells to insure that they are properly plugged when abandoned. A house subcommittee is also considering a similar bill.

Huge Water Flood Approved

AUSTIN.—Warren Petroleum Corp. and 18 other firms have the green light from the Texas Railroad Commission to launch a huge new water-flood project early this summer in the Canyon lime pay of Sharon Ridge-Diamond M field in Scurry and Borden counties.

The big West Texas unit will take in 337 oil wells on almost 13,500 productive acres. The flood will require an estimated $21,000,000 ultimately for capital and operating expenses and will recover about 109,000,000 bbl. of additional oil.

Plans for the unit and the flood were submitted to the Railroad Commission for approval at a hearing here January 14 *(The Oil and Gas Journal, January 24, page 69).*

The Sharon Ridge project will be the third adjoining pressure-maintenance operation in the Canyon lime in Scurry County. The others, to the north, are the SACROC water and gas-injection project and the water flood conducted by the Diamond M Unit in Diamond M field proper. Together these three operations will account for more than 800,000,000 bbl. of crude oil which otherwise could not have been recovered.

The Sharon Ridge program calls for initial injection of at least 30,000 bbl. of water daily through 31 input wells around the perimeter of the field.

Water will be obtained from Lake J. B. Thomas and injected at 6,800 ft.

Gathering System Sold

MIDLAND, Tex.—Shell Pipe Line Corp. has purchased almost 100 miles of crude-oil gathering lines in the Hendrick district of Winkler and Ward counties of West Texas and southeastern Lea County, New Mexico, from Service Pipe Line Co.

Purchase price was not disclosed.

The lines are connected to about 260 producing wells with a current output of about 5,000 bbl. daily. Shell will take over the system March 1 and move the oil to refineries through trunk lines of which it is part-owner.

Gathering Lines Contracted

HOUSTON. — Holder Construction Co., Snyder, Tex., will build 18 miles of crude-gathering lines in southwest Borden County, Texas, for the Texas-New Mexico Pipe Line Co.

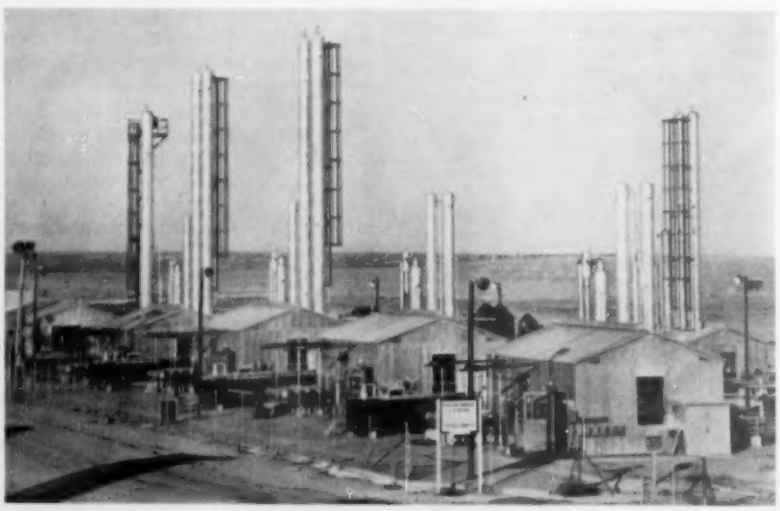
Included will be 10 miles of 8⅝-in. pipe. Work will be started immediately to extend the lines from Good field to Jo-Mill Spraberry field.

Texas Firms Buy Production

DALLAS.—Nortex Oil & Gas Corp., Dallas, and other unidentified interests last week paid $1,000,000 for 26 producing oil wells in the multipay Engle Strawn and conglomerate and South Belcherville fields of Montague County, North Texas.

The purchase included 1,000 acres of leases. Production from the wells is running about 20,000 bbl. a month. The Engle Strawn and conglomerate field wells are located about 2 miles north of Montague. South Belcherville production is about 2 miles southeast of Belcherville.

Officers of Nortex are James R. Wendover, president; William E. McCommons, vice president; and Raymond L. Gibbs, secretary-treasurer.



L.P.G. Plant Goes on Stream in Colorado

Russell Engineering Co., Houston, has completed this five-unit miniature L.P.G. absorption and extraction plant near Sterling, Colo. The plant is stepping up recovery from gas-distillate wells and can handle up to 20,000,000 cu. ft. of gas daily. The units can operate at low, medium, or high pressure and can be easily moved when field production is too low for economical operation. The units are designed to operate profitably on as little as 1,000,000 cu. ft. of gas daily. The plant is located across the road from a compressor station of Kansas-Nebraska Natural Gas Co., and about 2 miles from a natural-gasoline plant which Kansas-Nebraska operates.

Red tape removed from . . .

Louisiana Lease Rules

BATON ROUGE. — The Louisiana State Mineral Board has cut through some legal cobwebs and come up with simple ground rules governing leasing of state tracts.

A summary of the rules was recently compiled by the board and provides a ready guide for interested parties. A more detailed listing containing numbers of the laws pertaining to state leases also is available.

The board, which is authorized to grant oil, gas, and mineral leases on all state lands, breaks the leasing procedure into three major steps: application, advertisement, and bidding.

Application . . . An interested party may request the advertising of bids on certain state lands merely by applying to the board in writing. The request must give a detailed description of the area involved, approximate acreage, and a plat outlining in red the area to be advertised. A certified check for $100 must accompany the request. This is returned to the applicant if he submits a formal bid on the land.

The board also may advertise for bids on a lease without waiting for application.

No tract may contain more than 5,000 acres, and no lease may include two or more noncontiguous tracts.

Applicants for offshore leases have to use maps adopted by the board and identified by area.

The block system laid out on these maps will be used in all cases except where the board engineer makes amendments. No single application may cover acreage in more than one block.

Advertisement . . . State-owned tracts have to be advertised in the State Journal and in the official journal of the parish concerned for at least 15 days. The advertisements will set forth the description of the land to be leased, the time when bids will be received, minimum royalty to be demanded, and other significant facts.

When a public agency such as a school board, parish, or municipality is involved in leasing lands, it may either handle its own leasing or have the board do so. In such case a written lease application has to be made before lands may be advertised. All leases made by the agency must be approved and countersigned by the State Mineral Board.

Bidding . . . Bids are sealed and opened publicly at the state capitol. The number of the tract covered by the bid is required on the envelope.

A bid may cover all or any portion of the tract advertised, with the board having the authority to accept the bid most advantageous to the state. The board may reject any bids, or it may lease part of the tract advertised and withdraw the rest.

In a joint bid, the undivided interest of each party has to be designated so the proportionate interest of each may be stipulated in the lease contract.

Rental and royalty requirements are:

. . . Annual rental is to be at least one-half of the cash bonus offered.

. . . Royalties may not be less than: one-eighth of all oil and gas produced and saved; $2 per long ton of sulfur produced and saved; 10 cents per ton of potash produced and saved; and one-eighth of all other minerals produced and saved.

. . . Term of an inland lease may not exceed 3 years, and the term of a gulf lease may not exceed 5 years.

The bidder has to enclose with the bid a certified check for the full amount of the bonus offered.

If the bid is rejected the check will be returned. If the bid is accepted and the bidder fails to enter into a written contract within 20 days after the lease is submitted to him for execution, the check will be forfeited.

Pipeline Firm Drilling

HOUSTON. — Gulf Interstate Gas Co. has begun a drilling program to supplement future earnings from its pipeline system.

The firm has acquired more than 6,000 acres of oil and gas leases in Acadia, St. Landry, and Evangeline parishes in southern Louisiana. Its subsidiary, Gulf Interstate Engineering Co., owns three-eighths of a working interest in 2,800 acres in Lafourche and Terrebonne parishes in Louisiana.

An 11,000-ft. test is being drilled in Terrebonne Parish now. The results will be known within 90 days.

Gulf Interstate also indicated that it would eventually boost its daily delivery to 575 million cubic feet of gas by adding 100,000 hp. to the existing 40,000 hp. now in use at compressor stations on its main line. The company hopes to start the program in 1956.

Seadrift Ethylene Oxide Plant on Stream

Carbide & Carbon Chemicals Co.'s fifth large-scale plant to produce ethylene oxide, polyethylene, and butadiene has gone on stream at Seadrift, Tex. Ethylene oxide is synthesized from ethylene by the direct oxidation process pioneered by the company. Carbide & Carbon has a sixth plant under construction at Torrance, Calif., to make the same products.

Canadian Surplus Looms

A.I.M.E. speaker says potential output by 1960 will be a million barrels daily or twice what Canada can absorb

C. O. Willson

CHICAGO.—Western Canada by 1960 will have a potential crude production in excess of a million barrels daily. This will be approximately twice the amount of crude that can be profitably sold in Canada in face of imports.

W. O. Twaits, vice president, Imperial Oil, Ltd., made this prediction while speaking at the petroleum session of the annual meeting here of the American Institute of Mining and Metallurgical Engineers.

He said the prospective oil area of western Canada should develop proved reserves over a normal producing generation of 20 to 25 billion barrels. This does not include heavy crudes, oil shales, or the tars of Athabaska. The latter have a reserve estimated from 100 to 300 billion barrels.

The Canadian oil demand by 1960 will be around 650,000 bbl. daily, of which 400,000 bbl. will be in markets now supplied with western Canadian crude. Twaits said extending pipelines east to supply all of the Canadian market would mean excessive hardships on producers. They would be forced to absorb more of their transportation disadvantages in their well prices.

Tariffs are not the answer to the problem of protecting the rapidly expanding Canadian supplies. Twaits said the tariff could only be constructed as a form of transportation subsidy. One result of the tariff would be a further increase in the cost of finished products to consumers who already pay more taxes than United States consumers.

The answer, Twaits said, is to consider the future Canadian supplies on a continental basis.

"I suggest that a realistic look at the future must take into account a growth in continental oil requirements to a figure of 12 to 14 million barrels daily in the next 20 years. No matter how pressing current problems of market outlet are, I think we can agree that the normal optimism of oil seekers will have plenty of latitude in this outlook."

Western Canada's crude-oil production this year will average 330,000 bbl. daily, Twaits predicted. This will come from proved reserves which now total 2¾ billion barrels. This crude supply serves an area stretching 2,500 miles from the Pacific Coast to the Great Lakes. Two major pipeline systems with an ultimate capacity of 600,000 bbl. daily provide the principal eastern outlets.

Twaits gave the following breakdowns of crude-oil requirements:

British Columbia	**49,000**
Puget Sound	**37,000**
Canadian Prairie Provinces	**118,000**
U. S. Lakehead-Minneapolis area	**21,000**
Ontario	**105,000**
Total	**330,000**

In stressing the limitation to how far east Canadian crude could be used to supply dominion markets, Twaits presented a table showing that Canadian crude is penalized a minimum of 22 cents per barrel in relation to posted schedules in the U S. for comparable crude. This penalty is the result of transportation disadvantages.

Twaits, whose address coincided with the eighth anniversay of the Leduc and the Red River discoveries, pointed out oil men cannot predict nor control the timing of new resources and needs.

"We do not have the historical record of the oil business to show that the joint forces of supply and price cannot remain out of equilibrium for any length of time. In this equilibrium, it is axiomatic that oil supplies should move to the nearest and best-priced market, representing the maximum incentive to the producer and royalty owner."

Pipeline influence . . . The recently announced pipeline construction connecting eastern Montana fields to major lines in Wyoming and eastern outlets will bring renewed exploration in that area, according to Jack D. Duren, Shell Oil Co., Billings, Mont. Duren spoke at a technical session of the petroleum branch.

He was referring to a proposal of Shell and Murphy Corp. to lay a 16-in. line from the Poplar and Glendive area to connections at Fort Laramie and Guernsey, Wyo., with Western and Platte pipelines *(The Oil and Gas Journal, February 7, page 77)*.

The decline in activity in 1953 and 1954 following a series of discoveries was the natural result of conditions brought about by the lack of pipeline outlets with resulting low prices to producers, Duren said.

He said the Williston basin is in much the same position as the Permian basin and East Texas embayment were 25 years ago.

"This is a huge area and the density of drilling is less than one well per

NEW AND OLD DIRECTORS of A.I.M.E. representing the petroleum branch are, left to right, John R. McMillan, Monterey Oil Co., Los Angeles; E. C. Babson, Union Oil Co., Calgary; Carl E. Reistle, Jr., president-elect of A.I.M.E. for 1956, Humble Oil & Refining Co., Houston; Harold Decker, Houston Oil Co., Houston; Lloyd E. Elkins, Stanolind Oil & Gas Co., Tulsa; Richard W. French, Sohio Petroleum Co., Oklahoma City; and Howard Pyle, Monterey Oil Co., Los Angeles.

300 sq. miles, including field development wells. Parts of the basin have relatively few prospects for oil and gas production, but the exploration of its thousands of cubic miles of potentially productive sediments has hardly begun."

The eastern Montana fields, according to Duren, should produce a daily average of 50,000 bbl. in 1955.

Imports Defended

Federal economist backs actions taken by importers

CHICAGO.—Petroleum imports into the United States have enabled this country to build up its proved reserves following the war and postwar shortages so that we now have a normal relationship between reserves and current needs.

In addition, imports have made it possible to build up a potential production in excess of M.E.R. which will be available in case of national emergency and outside supplies are shut off.

These and other accomplishments of imports were stressed by H J. Barton, petroleum and natural-gas economic coordinator of the U. S. Bureau of Mines, Washington, in a paper presented before the mineral economics division of A.I.M.E. at its annual meeting here. Barton is a widely known economist who heads the department which collects and prepares most of the petroleum data supplied by the Bureau of Mines.

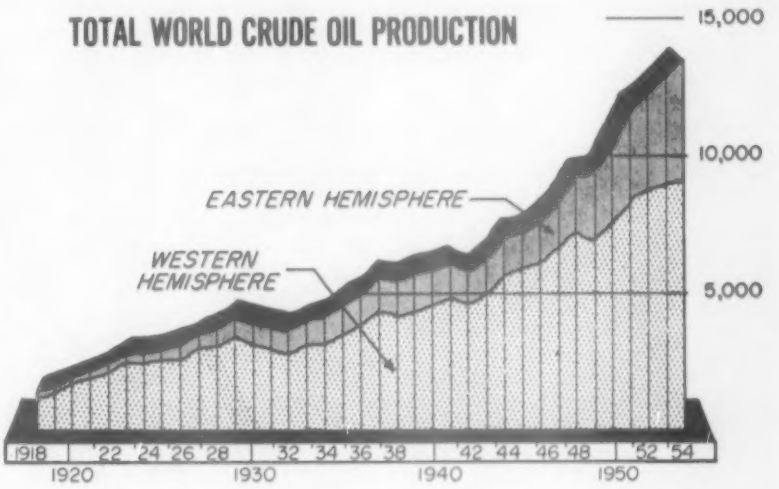
In regard to imports, Barton said that dollars spent abroad eventually "flow back to this country for the purchase of goods or services. In this way they continue to support our domestic level of economic activity and contribute to our general welfare."

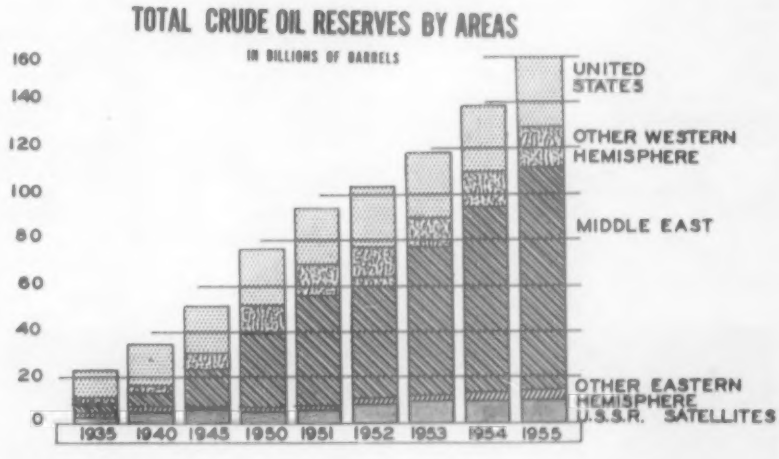
Resid oil's role . . . In addition to supplying the United States crude oil when it was not available in sufficient quantities, imports of residual-fuel oil have made up for the decline in residual yields at United States refineries and has prevented shortages developing.

"It is significant that between 1946 and 1953 the total United States supply of residual-fuel oil from all sources increased only 18.6 per cent, somewhat less than the 21.7 per cent increase in our total supply of energy," he said.

The future . . . As to the future Barton said: "Should prices for crude oil increase appreciably, they will encourage a more rapid increase in imports. In the case of residual fuel imports, it is reasonable to expect them to increase faster than our consumption of this product as domestic refiners continue to make progress toward reducing the yield of lower-priced products.

"I feel that arguments against imports have been better publicized than the contrary viewpoint and have taken this opportunity to point out that the actions of the importing companies are dictated by the harsh realities of the economics of the world we live in, not by any intent or desire to injure domestic operators."





Middle East Continues Oil Gains

CHICAGO.—World crude-oil production climbed 4.8 per cent last year, and the bulk of the gain was in the Eastern Hemisphere.

A symposium on world-wide oil developments at the A.I.M.E. meeting here February 13-17 developed these points:

. . . Production in the Western Hemisphere increased only 118,000 bbl. daily, or 1.2 per cent, over 1953, while the Eastern Hemisphere showed a gain in 1954 of 512,000 bbl. daily, or 12.6 per cent. The United States had a small decrease in production.

. . . World proved reserves showed an increase during 1954 of 20.5 billion barrels. This brings total proved reserves to 159.4 billion barrels and represents the biggest yearly gain in the history of the petroleum industry.

The dominance of the Eastern Hemisphere was even more apparent in the reserves figures than in production. Of the 20.5-billion barrel increase, 16.3 billion barrels were added in the Middle East, moving this area's reserves figure from 81.1 to 97.4 billion barrels. Kuwait and Saudi Arabia each accounted for 8 billion barrels gain.

Advice to ambitious engineers:

Three Skills Make an Executive

CHICAGO.—Contrary to popular belief, management does not pick, but rather acknowledges, those chosen as leaders.

In the competition within a company, certain persons emerge in their own right as managers. This means, in effect, that groups within an organization recognize ability and actually select their own leaders and managers.

This and other basic factors in industrial leadership were emphasized by J. C. Donnell, president of Ohio Oil Co., in addressing the annual dinner of the Petroleum Branch of the A.I.M.E. here February 15.

Speaking on the subject, "Engineers in Management," Donnell said:

"I feel strongly that American industry and the oil industry in particular must depend on all of its professional and highly skilled employes as a reservoir of managers today and increasingly so in the future.

"There is no reason why all the characteristics of managers at different levels should be similar and why they shouldn't vary from company to company and from industry to industry."

Donnell said there are three principal skills required of engineers who would become managers. These, he said, are:

. . . Performance. This involves technical proficiency, part of which is acquired by training in scientific schools. It has to do with methods, procedures, processes, or techniques. To perform properly, Donnell said, an individual must have analytical ability and proficiency within a special field.

. . . Ability to work with, and through, others. "This skill is revealed by the manner in which individuals behave with superiors, equals, and subordinates," Donnell said. "If this skill is highly developed in an individual, he is aware of not only his own attitudes and prejudices . . . but he also recognizes the existence and validity of viewpoints which differ from his own."

. . . Capacity to envision an enterprise in its entirety. He must be able to recognize the importance of each part of the whole. He must also recognize a company's responsibilities to its industry, the community in which it operates, and its effect on the political, social, and economic forces of a nation. It also includes the ability to make all skills effective in action.

Donnell said he does not believe that an engineer should have to enter management to advance. Each individual, he said, should be judged by his performance and rewarded accordingly.

"I have repeatedly stated," Donnell said, "that the oil industry is large, varied, and complex, and that it employs a multitude of talent to perform its basic functions. In the rise toward top-level management positions, petroleum engineers will have to demonstrate by performance that they are as capable as the other specialized personnel."

CHAIRMAN AND NEW MEMBERS of the executive committee of the petroleum branch, A.I.M.E., are, left to right seated, G. L. Yates, Amstutz & Yates, Wichita, Kans.; John R. McMillan, Monterey Oil Co., Los Angeles, retiring chairman; R. B. Gilmore, DeGolyer & MacNaughton, Dallas, chairman; and Phil Lehnhard, East Texas Engineering Association, Kilgore, Tex. Standing left to right, Joe B. Alford, executive secretary, petroleum branch, Dallas; George R. Gray, Houston, Baroid Sales Division, National Lead Co.; and Earl Kipp, New Orleans, The California Co.

New Name Voted

A.I.M.E. adding Petroleum to title; office shift pends

CHICAGO.—As soon as charter details can be cleared, it will be the American Institute of Mining, Metallurgical and Petroleum Engineers.

The addition of "petroleum" was approved by the board of directors of A.I.M.E. at a meeting held April 13 in connection with the annual sessions of the institute.

The change in name comes as a long-delayed recognition of the importance of the petroleum branch in the activities of the institute, one of the oldest engineering organizations of this country. Before the vote was taken it was explained that with over 7,000 members the petroleum branch represents about 30 per cent of the total A.I.M.E. membership.

Members were somewhat startled by a report of a committee of directors recommending that the institute's headquarters be moved from the Engineering Societies Building in New York to Pittsburgh. It has been agreed for some time that the old headquarters are no longer adequate.

Sites in Philadelphia, Chicago, and New York as well as Pittsburgh have been considered by the committee. Final action was postponed pending further study with other engineering societies which may want to join A.I.M.E. in moving their headquarters from the New York location *(The Oil and Gas Journal, February 14, page 75).*

Next year when "petroleum" becomes part of the institute's name, C. E. Reistle, Jr., director of production for Humble Oil & Refining Co., will become president of the organization. H. DeWitt Smith, consultant of the mining industry, New York, is president this year.

Cherokee Adds Terminals

PONCA CITY, Okla.—Work has started on a $3,000,000 construction program to add four terminals serving Cherokee Pipe Line Co.'s products system.

Terminals are being built at Mount Vernon, Mo.; Wood River, Ill.; and Wichita. Work will begin within a few weeks on a fourth terminal at Oklahoma City.

The terminals will be completed this spring and will permit the products portion of the Cherokee system to begin full-scale operations in March.

Cherokee operates a 570-mile products line between Ponca City and Wood River, an 83-mile products line between

Ponca City and Wichita, and a 1,050-mile crude-oil system. The company was formed last summer by Continental Oil Co. and Cities Service Pipe Line Co. following pipeline purchases from Interstate Oil Pipeline Co. and Ajax Pipe Line Co. *(The Oil and Gas Journal, July 26, 1954, page 134.)*

The Wood River terminal will have a capacity of 830,000 bbl. Capacity of the other terminals will be: Mount Vernon, 150,000 bbl.; Wichita, 110,000 bbl.; and Oklahoma City, 50,000 bbl.

Proration Started

Two Oklahoma purchasers list February cutbacks

OKLAHOMA CITY. — Two Oklahoma purchasers have started pipeline proration as result of the high rate of crude-oil production.

Rock Island Refining Co., second largest crude purchaser in the state, and Anderson-Prichard Oil Corp. are the firms cutting back.

Rock Island is taking only 80 per cent of the February allowables in fields where its gathering system is connected. The company mainly serves southern Oklahoma. Anderson - Prichard's purchases in Cement pool of Caddo County are only 75 per cent as great as its January purchases, which totaled about 12,000 bbl. daily.

There was some pipeline proration in Oklahoma last May when production was running above market demand. Then the Corporation Commission reduced allowables, and purchasers quickly returned to taking all crude offered.

Allowables raised . . . In January the commission raised allowables sharply, and raised them again in February. The February allowables total 575,000 bbl. per day, though actual production is somewhat below that. The figure is about 130,000 bbl. per day higher than purchasers' nominations for February.

Some crude buyers estimate that 30,000 to 50,000 bbl. per day of Oklahoma crude is going into storage at present for lack of markets. It is generally felt that refinery runs will decline with the end of the heating season in March and that this will create a further surplus of Oklahoma crude.

A group of crude-oil purchasers laid this situation before Gov. Raymond Gary last week, and it is understood that he agreed that refiners could not be forced to buy Oklahoma crude but that the state needs to produce at least 500,000 bbl. per day.

The Oklahoma Corporation Commission is expected to review the situation at a hearing February 23.

Spring Strike Talked

O.W.I.U. may begin swinging bigger stick after merger with chemical workers; industry ignores wage demands

DENVER.—The Oil Workers International Union, smarting over its failure to get a 5 per cent wage increase for its 125,000 members, may back up its demands with action after the C.I.O. convention in Cleveland next week.

The O.W.I.U. policy committee—which revoked a no-strike pledge last November—will convene 2 days before the regular convention opens. The committee will review the union's general bargaining plans.

The group will meet a second time after the O.W.I.U's merger with the 100,000-member United Gas, Coke and Chemical Workers Union has been completed. This is scheduled for February 28.

"There is a possibility the committee, together with leaders of the chemical workers, may take some positive stand on a strike," an O.W.I.U. spokesman said last week. A shutdown, if one is called, probably would come this spring.

O.W.I.U.'s JACK KNIGHT

". . . . companies still dragging feet."

No progress yet . . . Demands for the 5 per cent boost have been renewed in the past 2 months at some 700 plants and companies where the union is bargaining agent.

"There have been no major settlements," O. A. (Jack) Knight, O.W.I.U. president, said.

"There have been a few minor agreements," he added, "but generally the companies are still dragging their feet. No wage trend has been established."

Most of the new contracts have been at small plants, and the wage question has been left open. A settlement with one or more major operators would serve as a pattern in the industry.

The oil workers received their last general wage increase, 4 per cent, in mid-1953.

Knight, who recently charged the oil industry with adopting a "plant first, people second" policy which resulted in a "wage freeze," said agreements covering more than half the union membership have expired or are up for renegotiation.

The O.W.I.U. president believes the oil workers can count on a strike force of about 300,000 men, including some or all of 31 independent unions.

The oil workers staged their last nationwide strike in 1952, when O.W.I.U. was joined by 21 independent unions. They succeeded in shutting down about 50 refineries. The 1952 settlement was for 15 cents, plus small hourly night-work differentials. They asked for 25 cents an hour.

Targets . . . In addition to the merger with the chemical workers, O.W.I.U. is conducting a widespread organizing campaign. Immediate targets are the Standard Oil Co. (Ind.) refinery at Whiting, Ind.; a new Standard refinery at Mandan, N. D., employing 150 men; and the Phillips Petroleum Co. plant at McGregor, Tex., which is operating on a pilot basis in the production of rocket fuel.

At Whiting, O.W.I.U. seeks to take in about 6,500 members of the Independent Petroleum Workers of America, a splinter group which pulled away from the Central States Petroleum Union a few months ago when some leaders favored merging with O.W.I.U.

If card-signing efforts fail at Whiting, Knight said, O.W.I.U. will petition the National Labor Relations Board for an election to select a bargaining agent. This would come at the end of the year when the independent union's contract expires.

O.W.I.U. has already petitioned the N.L.R.B. for an election at Phillips' McGregor plant, where 500 of 1,000 present employes are eligible for union membership. In 3 years, Knight said, the plant will have a work force of about 10,000, of which 7,000 would be potential O.W.I.U. members.

Corrosion Reduced To Basics

The whys and wherefores of pipeline corrosion and how to control it are explained in N.A.C.E. short course

R. G. Deering

TULSA.—"What is it?" "Why does it happen?" "How can I stop it?" These and other questions on corrosion control got some practical, workable answers here last week. The occasion was the sixth annual corrosion short course sponsored by the Tulsa section of the National Association of Corrosion Engineers.

More than 200 pipeline engineers and foremen got some basic training in corrosion control in this 3-day session. Field demonstrations and talks by experienced corrosion engineers covered the subject from basic concepts to practical methods of mitigation.

No long-haired papers were presented nor were any new theories on corrosion advanced. There weren't supposed to be any. Instead, speakers aimed at the new corrosion engineer and the field man who needs some knowledge of corrosion in his every day work.

Basic theory . . . Yale W. Titterington, Corrosion Services, Inc., told the group there's nothing mysterious about corrosion. He used hydraulic analogies and diagrams of a simple dry-cell battery to explain the basic corrosion cell.

Before corrosion can occur, he said, four things must be present. They are:

. . . An anode—the part of a pipeline which corrodes due to current discharge.

. . . A cathode—the part of a pipeline which receives current and is protected.

. . . An electrolyte—the soil around the pipe.

. . . A low-resistance current path—the pipeline itself.

These are all present on a buried pipeline and corrosion will occur unless preventive measures are taken.

Measurements . . . Finding corrosive areas on a pipeline is done with one of the four main methods, Jay R. James, Cathodic Protection Service, told the group. These are measurements of surface potential, soil resistivity, pipe-to-soil potential, and line currents.

The surface potential method, newest of the four, has been used quite successfully in recent years, he said. If it fails, the reason can usually be traced to poor procedure in taking data or to false interpretation of good data. The method should not be used if more than one line is involved or if heavy stray currents are present. James said a two-man crew can cover up to 5 miles of line per day with a surface survey.

Mitigation methods . . . W. A. Hutchinson, Sinclair Pipe Line Co., stressed the value of coatings, cathodic protection, and insulated flanges as a team. One of the first two is of little use without the other. The last is the cheapest method of directing current to a desired part of a pipeline.

Hutchinson advised maintenance foremen to apply some sort of coating to any bare line which they have to uncover for repairs. Then, he said, expendable anodes should be installed to aid the coating. Without the anodes, leaks will appear in a short time in the coated section since the coating will concentrate anodic areas on the pipe.

Cathodic protection . . . Other speakers explained use of expendable anodes and rectifiers as current sources. The group was told that generally anodes should be used where current demands are low or where uniform distribution of current is desired. On the other hand, rectifiers fill the bill when large amounts of current are needed or where a long line must be protected from one or two locations.

SHORT-COURSE INSTRUCTORS inspect visual aids used in the session on corrosion control which was held in Tulsa. Left to right the instructors are W. A. Hutchinson, Sinclair Pipe Line Co.; Maurice A. Riordan, Rio Engineering Co.; James C. Bell, Service Pipe Line Co.; and W. E. Huddleston, Huddleston Engineering Co.

Idaho May Be Next

Gas well on western edge of state reported flowing

PAYETTE, Idaho.—There is a strong possibility that Idaho may soon call itself a producing state—the 31st in the nation.

A gas flow that has been classified as commercial is reported at a Payette County wildcat in western Idaho's portion of the Vale-Ontario basin. Oroco Oil & Gas Co. reported a flow of gas from a depth of 1,442 ft. at 1 Carpenter, SE NE 4-8n-5w, near Payette. No gage or producing formation was revealed by the operator. Two previous wells in the immediate area tested gas.

The indicated wildcat hit is located on the eastern side of the small Vale-Ontario basin that straddles the Oregon-Idaho border. Recently El Paso Natural Gas Co. drilled a dry test on the other side of the basin in Oregon. The proposed Pacific Northwest pipeline runs through this area.

N.G.A.A. Meeting Slated

MIDLAND, Tex.—Instrumentation, safety, water-treating, and product-testing procedures will feature discussions on the technical program of Permian basin regional meeting of the Natural Gasoline Association of America here February 25.

Principal nontechnical address of the session will be made by Rex. G. Baker, general counsel of Humble Oil & Refining Co., Houston. Baker will discuss the Supreme Court decision in the Phillips case.

Refineries Expand

Texaco places new units on stream at two plants

NEW YORK.—The Texas Co. has completed extensive modernization and expansion programs at its El Paso and Amarillo, Tex., refineries by placing on stream two new Platformer-Unifiner units.

At El Paso, crude capacity has been boosted from 5,500 to 10,500 bbl. per day with a new combination crude-delayed coking unit which will process 2,800 bbl. per day of heavy residuum. A 3,000-bbl. per day fluid catalytic-cracking unit has been built, and new polymerization capacity stands at about 300 bbl. per day. Foster Wheeler Corp. handled the major share of the construction program at El Paso.

Capacity of the Amarillo works has been expanded from 8,500 to 15,500 bbl. per day with a new crude unit. Also installed were an Orthoflow fluid catalytic-cracking unit of 6,000 bbl. per day capacity, a 3,600-bbl. per day delayed coker, and alkylation and polymerization units capable of producing 500 and 470 bbl. per day of product, respectively. M. W. Kellogg Co. was primary contractor on this project.

The new hydrogenation - reforming units are tied closely together. The Unifiners will take hydrogen from the catalytic reformers, to pretreat reformer feed stocks, consisting of coker distillate and straightrun naphtha. Both units are designed to produce an 85 F-1 clear octane-blending component.

The Platformer - Unifiner units are designed and licensed by Universal Oil Products Co. The El Paso unit is rated at 3,300 bbl. per day and the Amarillo unit is 4,800 bbl.

Other projects . . . With work at El Paso and Amarillo completed, Texaco engineers remain busy. Building programs are nearing completion at six other Texaco refineries across the country.

New Platformer-Unifiner units are going in at the Westville, N. J.; Lockport, Ill.; Lawrenceville, Ind.; West Tulsa, Okla.; and Port Arthur, Tex., plants. At Wilmington, Calif., a Platformer-Hydrotreater unit is going in. Alkylation capacity is being added at Westville, Lockport, and Lawrenceville.

At Montreal East, Que., Texaco's subsidiary, McColl-Frontenac Oil Co., Ltd., is adding a combination Platformer-Unifiner.

Texas Gas to Add Line

OWENSBORO, Ky. — Texas Gas Transmission Corp. is ready to add 207 miles of line to its transmission system in Louisiana, Mississippi, Tennessee, Kentucky, and Indiana.

The company has filed an application for authority with the Federal Power Commission. In addition, the company will increase its compressor horsepower by 22,600.

Ninety miles of the line will parallel sections of the existing system.

Television Helps Esso Save On Fuel Bill

BATON ROUGE.—Television is saving money for Esso Standard Oil Co. at its central mechanical building here. It helps shut the main exit doors.

The economy comes from money saved in heating and cooling the building, which covers 3 acres. The dispatcher has a TV screen in his office. As vehicles roll out of the building, he can see the instant they clear the door. He flips a switch, and the door drops down with a minimum loss of hot or cool air.

An electronic-eye system was considered. But the wide variety of vehicles passing through the building made this idea impractical.

Before the TV arrangement was installed drivers stopped their vehicles, climbed out, then closed the door. The time required to close the door upset the temperature control, especially during extreme weather conditions.

But, plant personnel solved the problem with a floor switch that automatically opens the door and a TV set that helps close it.

Personnel man tells W.P.R.A. . . .

How to Recruit Good Engineers

F. Lawrence Resen

BEAUMONT, Tex. — If companies are to bolster technical forces with high-caliber engineers, they'll have to go to colleges to get them.

There is already such a shortage of trained engineers, no company should take more people than it needs or it will increase this shortage.

R. N. Dyer, personnel chief of Humble Oil & Refining Co., told a regional meeting of Western Petroleum Refiners Association here that technical graduates of colleges and universities dropped from a high of 50,000 in 1950 to only 19,000 last year. This will improve, he said, and will level off at about 34,000 in 1957.

Industry is short about 40,000 trained engineers today, he said. Just how bad the situation is, can be illustrated by the fact that 800 companies went to the Georgia Tech campus last year to interview only 750 graduates.

Dyer cited Humble's system as an example of making use of past experience. Humble's various departments list technical personnel needs and this list used as a guide to set up a recruiting program. Top management joins the interviewing teams which visit various campuses. A dozen top Humble officials went to the University of Texas last year for a general assembly held for prospective technical graduates. They discussed job conditions, company policies, and other factors of employment.

Humble receives no applications before an interview and offers no jobs on the spot, Dyer said. A prospective employe gets his application after the interview and the company follows up with requests for transcripts from the school. In addition, the faculty is asked to appraise the applicants.

Management screens the applications and makes a written offer to those accepted. Dyer emphasized that all applicants should be notified promptly of the decision, one way or another.

Dyer summed up the general attitudes of technical men and pointed to some as things which should be remembered when working with graduates. Included are:

. . . **Man is an individual** who doesn't want to get lost within a company. He wants to know what he is to do and the company's advancement policies as related to his job.

. . . **Financially,** he is interested in initial salary, but more important is the prospect of future financial rewards. He wants to know if his attention to his job will be recognized by the company. He is more interested in immediate benefits, such as savings programs and vacation plans than long-range retirement provisions.

. . . **Company attitude** toward military service is all-important. If he is called to duty he wants to know if his job will be there on his return. If he serves in a reserve capacity, he wants time to do so without jeopardizing his position.

. . . **Permanence** of his location is important, as are housing and community facilities for family life. The general geographical area of assignment is important to him.

. . . **Looking to the future,** he is interested in the background of the company executives and how they were able to advance; whether the company urges participation in professional societies; and if there is a training program set up to help him in his work.

Most of all, Dyer said, he is interested in proper placement—more than just a job. He wants to feel he can make a worthwhile contribution and thereby gain a feeling of belonging.

Oil Conference Set

T.P.R.C. meeting on oil recovery to be April 4-5

COLLEGE STATION, Tex. — The Eighth Oil Recovery Conference sponsored by the Texas Petroleum Research Committee will be held at Texas A. & M. College, April 4 and 5, according to Dr. G. H. Fancher, T.P.R.C. director.

Program will be "Symposium on the Wilcox Trend of Texas."

Papers will be:

April 4, 9:00 a.m.

"Generalized Geology of Wilcox Group, Northeast Texas" by John V. Townsend, Jr. (Hudnall and Purtle).

"Geologic Notes on Wilcox Producing Trend" by Lloyd Ryman (Continental Oil Co.).

"Core Analyses of Wilcox Sands" by Ben A. Elmdahl and R. J. Granberry (Core Laboratories, Inc.).

"Drilling Problems Along the Wilcox Trend" by Dr. George R. Gray and W. C. Kellogg (Baroid Sales Div.).

"Mud Logging in Wilcox Formation" by R. W. Wilson and A. W. Short (Baroid Sales Div.).

"The Wilcox—A Cementing 'Problem Child' " by Bob Diggs Brown (Halliburton Oil Well Cementing Co.).

April 4, 2:00 p.m.

"Electrical Logging Problems in Eocene Wilcox" by R. P. Alger (Schlumberger Well Surveying Corp.).

"Formation Fracturing in the Wilcox" Atlantic Refining Co. paper.

"Statistical Analysis of Types of Reservoir Control in Wilcox Trend" by L. B. Lesem and J. E. Haughn (T.P.R.C.).

"Petroleum Engineering Problems in Wilcox Trend Fields" by Gene Roark (James A. Lewis Engineering Co.).

"Recovery of Oil from Thin Oil Bands in Wilcox Trend" by John D. Howard and Gilbert M. Andreen (Magnolia Petroleum Co.).

April 5, 8:30 a.m.

"Gas Gathering and Treatment Problems in Wilcox Fields" by C. T. Wells, Jr. (The Goliad Corp.).

"Gas Marketing Problems for Wilcox Trend Fields" by John G. Jacobs (Wilcox Trend Gathering System, Inc.).

"Pressure Maintenance and Recycling in the Lake Creek Field" by Ray Kerr (Superior Oil Co.).

"Reservoir Performance and Producing Problems in the Slick Wilcox Field" by W. H. Rosser (Continental Oil Co.).

"Case History of a Wilcox Formation Field in South Texas." Stanolind Oil & Gas Co. paper.

April 5, 1:30 p.m.

"The Mercy Field" by John W. Walker and J. J. McMahon (Shell Oil Co.).

"Falls City Field, from Discovery Through Eleven Million Barrels" by Emil F. Bowers (Southern Minerals Corp.).

"Corrosion Problems in the Wilcox Trend" by Edward N. Jones (Pettus, Tex.).

"The 'J' Factor Involving Capillary Pressure Investigations in Oil and Gas Sands in the Wilcox Trend Formation" by W. M. McCardell (Humble Oil & Refining Co.).

Utah Strike Indicated

FARMINGTON, N. M.—Shell Oil Co. probably has scored another strike in the Four Corners area of southeast Utah.

A wildcat 5 miles southwest of last November's Desert Creek discovery yielded gas and 40°-gravity crude on a formation test at 4,662-4,784 ft. When a plugged tester which had halted the test was disconnected, the well blew oil and gas for 17 minutes. Initial flow pressure was 1,215 psi.

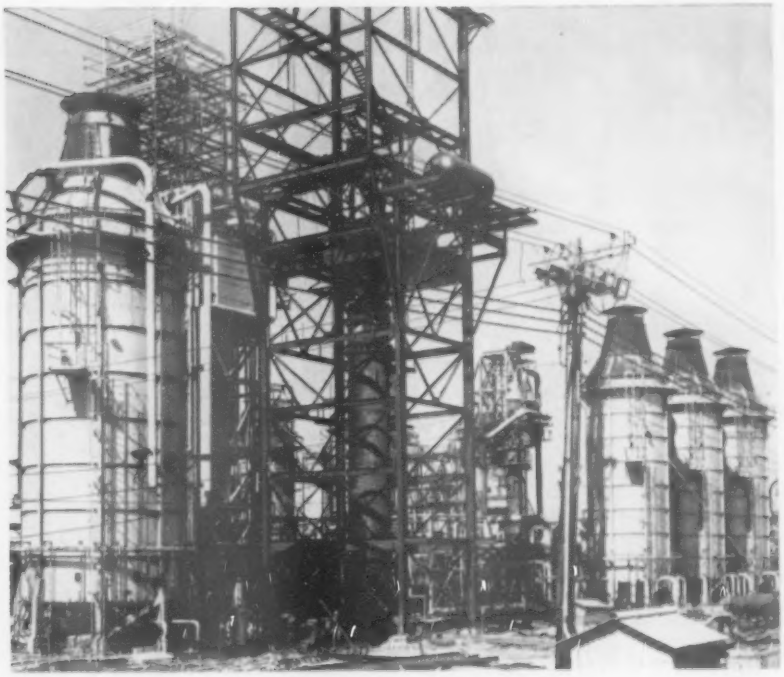
S. F. Bowlby, western area vice president, said in Los Angeles the indicated discovery is the Shell 1 North Boundary Butte, 25 miles northwest of the four-state junction.

Natural Gas Finds a Friend

CHICAGO.—The natural-gas industry last week picked up a strong ally in an "enemy" state.

The Illinois Manufacturers' Association went on record as being "strongly opposed" to federal control of natural-gas production. A resolution of the association's directors criticized the Supreme Court decision in the Phillips case. It said gas controls are a "threat to business and industry" throughout the United States.

Illinois, a big consuming state, was a major opponent of the Kerr bill in 1950.



Synthesis-Gas Work Progresses

BROWNSVILLE, Tex.—A gas generator that will play a key role in Stanolind Oil & Gas Co.'s hydrocarbon synthesis plant here is taking shape.

The big unit is being added as part of Stanolind's program to put the plant on its feet. The revamping program started last March when Stanolind took over the stock of Carthage Hydrocol, Inc. *(The Oil and Gas Journal, April 5, 1954, page 62).* The program has been running on schedule and should be completed in time for the plant to start production "late this year." The plant has been idle since June 1953.

The generator will be the second in the $50-million plant. It will burn natural gas with oxygen under closely controlled temperatures and pressures to produce synthesis gas. Further steps will convert the synthesis gas into synthetic gasoline and raw chemicals. The plant's oxygen manufacturing works is the largest in the world.

The plant will process 280,000,000 cu. ft. of air daily to —275° to separate the oxygen. The oxygen will be used to burn 90,000,000 cu. ft. of natural gas in the two generators to produce the synthesis gas. From the synthesis gas will come 6,000 bbl. of gasoline, 900 bbl. of diesel oil, 200 bbl. of fuel oil, and 300,000 lb. of chemicals.

The chemicals will be used at Stanolind's chemical recovery plant,

Imports Still Rising

I.P.A.A. says we'll get more from now 'til April

WASHINGTON. — The Independent Petroleum Association of America said last week that higher oil imports are in prospect from now through April.

It issued its estimate as the House ways and means committee turned down all suggestions to restrict imports and sent the reciprocal trade extension bill to the floor for passage.

The I.P.A.A. said that imports for Februray through April will average 1,250,000 bbl. daily. This will be an increase of 190,000 bbl. daily or 18 per cent over the same period last year. The imports will absorb about 14.7 per cent of the domestic market.

Although defeated in the House the domestic producers are looking to the Senate. There is no indication, however, that they will be more successful in the upper chamber.

The administration is opposed to quotas, both here and in foreign countries. President Eisenhower spoke out against them at a news conference this month. But Russell B. Brown, general counsel of the I.P.A.A., charged the administration with inconsistency. He pointed out that quotas are in effect on cotton, sugar, cattle, wheat, cigars, and other commodities.

Old stuff . . . "There is nothing new about quotas," Brown said in a report to the I.P.A.A. members. "Experience has shown that they are not only effective and practical to administer but that they have been, and are being, widely used by our Government. In the case of oil imports, quotas offer the only effective means of restraint."

Brown's views were echoed by the Independent Refiners Association of America.

"Diplomatic pressures are at work which make it increasingly difficult to stem the tide of imports," the I.R.A.A. said. Foreign producing countries count oil as a chief source of revenue. American companies operating there will have to support imports increased even beyond their needs unless they get the support of the U. S. in resisting these pressures.

The refiners urged that Congress give the President authority to call for a voluntary agreement among large importers to cut foreign supplies when an excessive level has been reached.

Industry Briefs

ANAHEIM, Calif. — Richfield Oil Corp. has started construction on a $3,500,000 experimental laboratory on a 20-acre tract here. The lab will include an administration building, engine laboratory, shops, pilot plant, main laboratory, high-pressure laboratory, and storage building.

NEW YORK.—Socony-Vacuum Oil Co.'s flying red horse will be operating out of a new stable if company directors get their way. The board has proposed the company name be changed to Socony Mobil Oil Co., Inc. They say the new name fits better with the name under which the company's products are sold. The proposal will be voted on by stockholders at their annual meeting April 28.

SANTA FE, N. M.—The New Mexico Oil and Gas Conservation Commission has hiked the state's March oil allowable to 261,767 bbl. per day. The increase of 4,085 bbl. daily over February came in the face of evidence showing that present oil stocks were high. Purchasers asked the commission for 161,320 bbl. daily, an increase of 3,431 bbl. over their request for February.

Gas Sparring Continues

President seeks more FPC funds to start regulation over producers; main fight awaits Cabinet committee's report

WASHINGTON. — President Eisenhower asked Congress last week for a quick $70,000 to get Federal Power Commission regulation of independent natural-gas producers under way.

The bid for the money was one of the preliminary moves made in the fight over the Supreme Court's ruling in the Phillips case. The main bout won't come off until the Cabinet energy resources committee files its report.

Other developments last week included:

. . . **More bills** filed to exempt producers from federal regulation.

. . . **FPC denial** of an application from Humble Oil & Refining Co. for a rehearing of Order 174-B. The FPC said Humble offered no new reasons why the order should be reviewed.

The money for the FPC was included in supplemental estimates of nearly $1,000,000,000 needed by a number of federal agencies to carry them through the fiscal year. The President said only that the $70,000 is needed "for regulation of a large number of independent natural-gas producers brought under the jurisdiction of the commission by the Supereme Court's decision in the Phillips Petroleum case last June."

The budget submitted to Congress last month provided $2,099,050 for FPC regulation and surveys of the natural-gas industry during fiscal 1956. This is $338,000 more than the commission has for the current year. Most of the increase is for the new producer regulation.

Committee criticized . . . The Cabinet committee's failure to come up with a report is beginning to draw the fire of Congress. House Speaker Sam Rayburn of Texas criticized the committee for holding up consideration of the legislation sought by the oil and gas industry.

"It's my feeling that these people . . . ought to be able to come up with something," Rayburn said.

Other southwestern congressmen have taken a similar stand. They say the committee, headed by Defense Mobilizer Arthur S. Flemming, has been dragging its feet, apparently hoping that Congress will start on the bill before a report is issued. The congressmen who will head the drive are waiting for Flemming to make the first move, but will soon be forced to do something if they hope to get the bill through this year.

New bills . . . Rep. Walter Rogers of Texas, who wrote the first exemption bill *(The Oil and Gas Journal, February 14, page 83)*, introduced two more in slightly different form. Rep. Frank Ikard of Texas also put in a bill. It would exempt the independent producers but not pipelines. But it would give the pipeline companies the fair market value of the gas they produce.

Congress clearly intended when it passed the Natural Gas Act that producers should not be subject to the utility type of regulation which is imposed on interstate transportation, Ikard said. More important, he said, no federal agency should have the power to fix the price of a commodity in peacetime simply because it moves in interstate commerce.

Naval Area to Be Leased

WASHINGTON.—Oil-bearing lands in Camp Wallace, Galveston County, Texas, have been transferred from the Navy Department to the Interior Department for development to avoid drainage.

The Interior Department will invite bids for leases on the 1,603 acres of the reservation threatened by the loss of oil through drainage by privately owned wells on adjacent lands.

Normally when acquired lands are set aside for military or naval purposes, the department getting them may grant oil and gas leases on the acreage. When agencies have surface control over so-called "drainage lands," however, they usually transfer them to Interior as in this instance.

Quick Decision Refused

WASHINGTON.—The Federal Power Commission refused last week to cut corners in passing on the proposed switch of the Little Inch pipeline from natural gas to petroleum products.

The commission denied a request by Texas Eastern Transmission Corp. to pass on its application without the usual intermediate report from the examiner who took the testimony.

The company wants a quick decision. It says it can't plan expansion of its gas system until it knows whether the FPC will approve the conversion. However, the commission said the final decision wouldn't come any sooner if the usual procedure were shortened.

The request for the speed-up was opposed by the Mississippi-Ohio rivers barge interests. They pointed out the commission's refusal is based in part on the need of a further look into what the switch would do to Texas Eastern's natural-gas operations. The barge operators claim the conversion would be a disadvantage to gas consumers.

Foreign-Oil Jitters

Dangers lurk in Russian threats, Jarman suggests

WASHINGTON.—Congress has been asked to take a long look at Middle East oil in the light of recent changes in leadership in Russia.

Rep. John Jarman of Oklahoma is asking the foreign affairs committee, of which he is a member, to set up a special group to make the study. Dangerous possibilties, he said, have been raised by a hint by Soviet Foreign Minister V. M. Molotov that Russia is looking to the "liberation" of the Arab countries.

"Russia is now looking with hungry eyes at the near east," Jarman said. "The fact that one of these oil-rich countries, Iran, actually adjoins Russia lends credence to such a possibility."

Policy needed . . . "In view of Molotov's aggressive statements and the obvious tension which prevails all over the world, we are in great need of a national policy as to oil and other strategic defense materials," Jarman said.

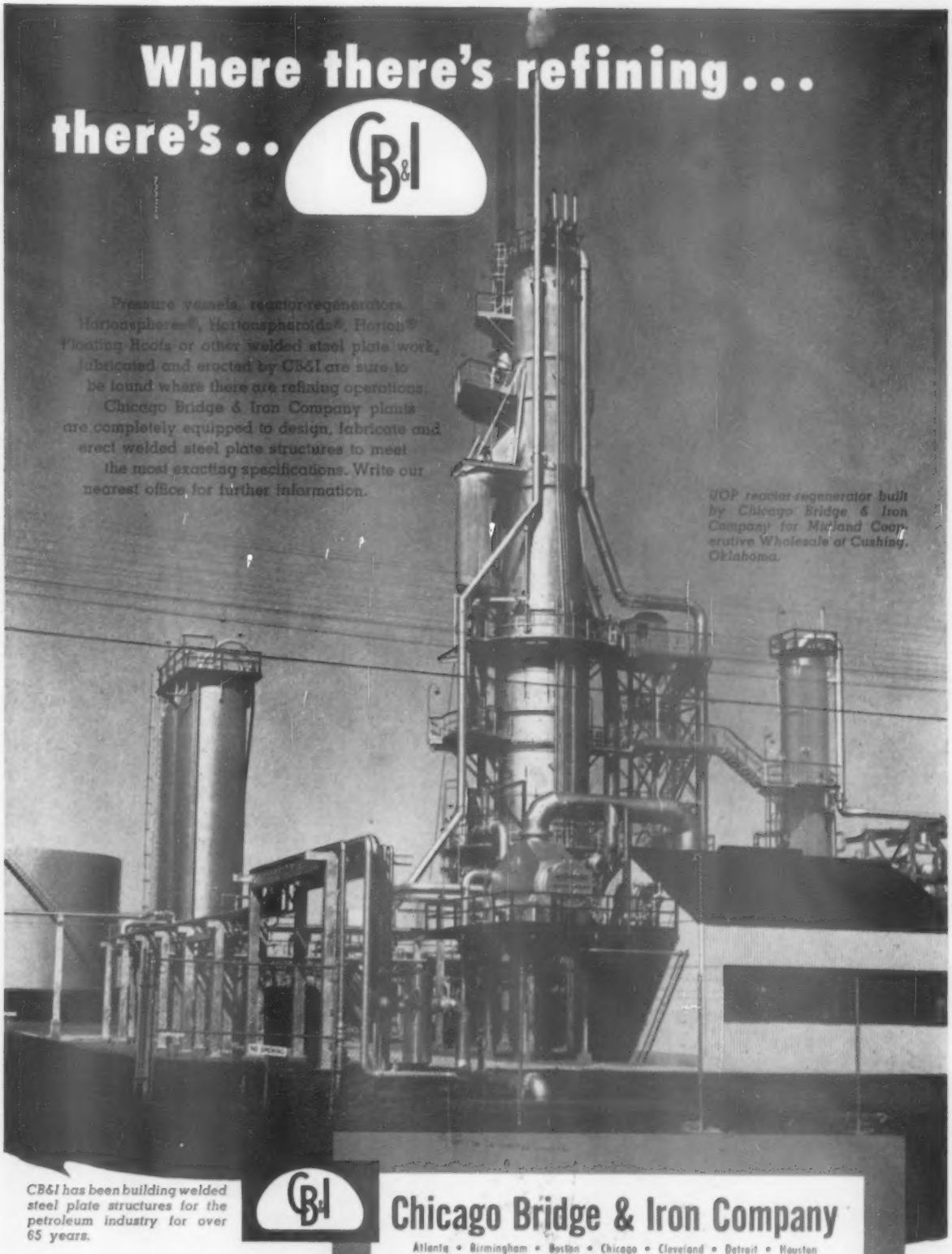
"As a nation, we should take an analytical look at the poliitical reliability of some of the countries upon which we have become increasingly dependent."

Jarman said there is no conflict between the reciprocal-trade program, which he supports, and a defense policy aimed at insuring an adequate domestic supply of oil in an emergency.

"It seems apparent that we can ill afford to look to countries in the Middle East for our supply of oil," he said. "I don't know the real facts. It seems that no one knows the true facts, and it is apparent that no formal study has been made to ascertain all of these facts."

Where there's refining . . . there's . . CB&I

Pressure vessels, reactor-regenerators, Hortonspheres®, Hortonspheroids®, Horton® Floating Roofs or other welded steel plate work, fabricated and erected by CB&I are sure to be found where there are refining operations. Chicago Bridge & Iron Company plants are completely equipped to design, fabricate and erect welded steel plate structures to meet the most exacting specifications. Write our nearest office for further information.



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RICHARD B. KAHLE
PRESIDENT

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CABLE ADDRESS
"EASTAPET"
HOUSTON, TEXAS

March 16, 1954

Mr. George R. Brown
Executive Vice President
Brown & Root, Inc.
P. O. Box 3
Houston 1, Texas

Dear Mr. Brown:

The rehabilitation of our alkylation unit and its conversion from hydrofluoric to sulfuric catalyst type was completed by your people last month and put into immediate operation. The work was finished in a hundred and one working days from the date you were given the contract.

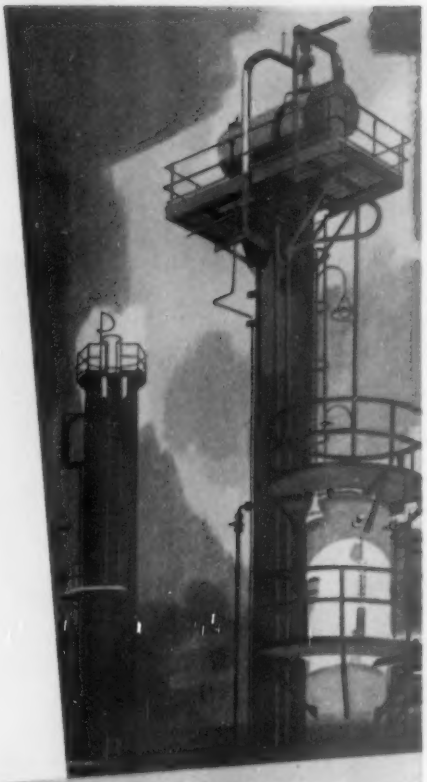
This work, I believe, sets a record in two cases: first, in time of completion; and, second, in the fact that the plant started up immediately on completion, was gradually brought up to capacity, is running at more than designed capacity, is running at full designed specifications and has required no substantial change of the equipment as completed.

As I told you shortly after this job began, it was of great importance for us to finish it promptly and have it in operation at full capacity immediately upon completion. You personally stated that you would do everything you could to expedite the completion and that it would be a good job. You have certainly complied in both instances.

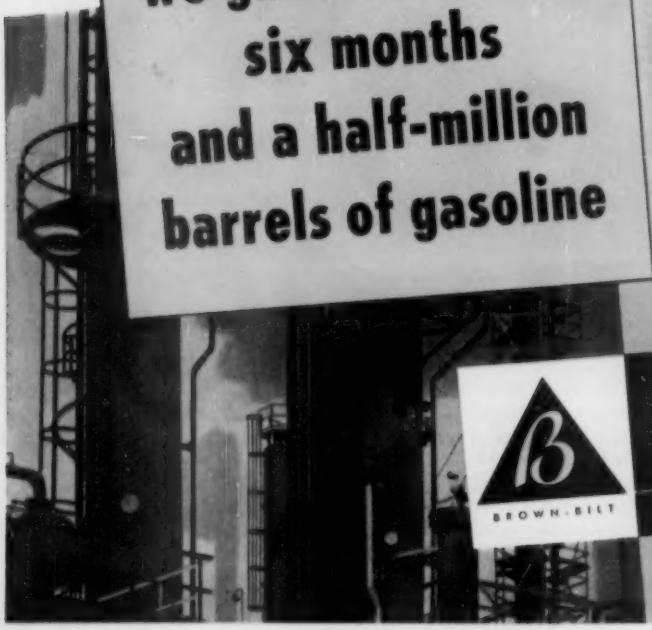
I want to thank you personally, and for my associates in the company, on the job you did for us and I wish you would convey to your associates who worked on this construction, our grateful appreciation and thanks.

Sincerely yours,

R. B. Kahle



we gave them back six months and a half-million barrels of gasoline



The new Eastern States Petroleum Company's aviation gasoline refining unit chalked up another rapid completion for Brown & Root. The plant was finished in the record time of 101 working days . . . cutting more than six months off normal construction time.

Early completion of a project means a bonus of unexpected production which, in the final analysis, represents a gratifying reduction in plant cost.

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Alaskan Stymie

Green light from Congress needed for Gubik opening

WASHINGTON. — Interior Department plans to open 21,000,000 acres of northern Alaska to private development appear to have hit a snag.

The lifting of a 12-year government reservation and the construction of a natural-gas pipeline from Gubik gas field to Fairbanks were proposed early last year.

The area surrounds Naval Petroleum Reserve No. 4 on three sides, and the Navy Department is reported still unable to decide how the reserve can best be protected.

Secretary Douglas McKay could lift the withdrawal of the lands outside the reserve on his own initiative. The necessary order was prepared last year but McKay delayed signing it while he looked for ways to head off any charge the administration was giving away potential oil and gas resources.

The secretary planned to lay the matter before the congressional interior committees for approval. Now it is expected bills will be introduced in both Senate and House to open the lands to entry, giving the entire Congress a chance to decide what shall be done.

What is involved . . . The main body of Gubik field lies outside the naval reserve. Its extreme western portion lies just within the eastern border. The Navy is charged with the protection of the oil and gas resources of the reserve. So the line-straddling field raises a problem.

While there is a mile-wide "buffer" zone around the reserve, in which private drilling would be prohibited, some thought has been given to widening the protective strip. This might bar development of Gubik field, although it is said the mile-wide strip would not.

The whole area running from the Brooks Range to the northern sea front of the territory was set aside by presidential order 12 years ago, when the Navy had hopes of discovering large oil fields in the reserve. When the Navy abandoned its exploration program in 1953, Alaskan interests pressed for release of the lands. At that time the department told a Senate subcommittee it had no objection.

Value of Output Jumps

WASHINGTON.—The refining industry raised its annual output $500,000,000 between 1947 and 1953.

The value of refined oil products, less cost of materials, supplies, fuel,

WATCHING WASHINGTON

Bertram F. Linz

Atom Answers Wanted

What would happen to the gas and other utilities of a community hit by an atom bomb? That's a question of importance to industry, the public and the Government. So the Atomic Energy Commission is going to try to answer it in April.

A new "town" is being built in the wilds of the Nevada atomic test area. It will have homes, fully furnished and provisioned. It will have industrial buildings with real equipment. It will have installations for electric power, liquefied petroleum gas and natural and manufactured gas.

And in the half-light of an early April morning the AEC will explode an atomic device and find out what happens to all this.

It's part of a step-by-step program to find out, first how to make the most destructive use of the atom bomb, then how military forces can stand up in atomic warfare, and finally how civilians can protect themselves and get back into business quickly after an attack.

The first two phases have been studied in previous tests. The 1955 tests, now getting under way, are aimed at getting civil defense information and experience.

Representatives of a number of industry associations, among them the American Gas Association and the Liquefied Petroleum Gas Association, will be invited to see what happens when the test town is bombed. They will learn first-hand the effects of atomic blast and heat on gas service lines and industrial and utility equipment.

Everyone Talks About It

Congress is thinking of doing something about the weather. A couple of things, in fact.

If it goes through, one idea will be a great help to the oil industry, which is going to sink a billion dollars or more and risk a lot of lives in the Gulf of Mexico.

Weather is one of the biggest hazards of offshore operations. Rep. Frank W. Boykin of Alabama thinks the oil companies and other industries there should have the best possible weather information. He has written a bill to provide a weather ship in the Gulf. Since he is a ranking member of the House merchant marine committee his bill may get serious attention this year.

A floating weather bureau far from shore could get advance information on approaching storms. It could rate their intensity and send out radio warnings when it looked like a big blow was coming.

That sort of weather service would be a big thing for the oil companies. On the basis of weather reports they bring in their men and loose equipment when a hurricane threatens. It's expensive when the storm doesn't hit; but it would be worse if the men were left out on the water and it did hit.

The other idea has to do with rain-makers. It has been charged they sometimes "seed" clouds and the rain falls in the next state, where maybe it isn't wanted. So there's talk of licensing them and making them file monthly reports of their activities—and the results.

This Is a "Give-Away"

A couple of years ago the air over Washington was fogged with charges the administration was "giving away" the tidelands. The tidelands were returned to the states and the Government kept the outer Continental Shelf and the outcry dropped off, especially when the Interior Department began to collect real money from leases.

But all those charges could be revived on the basis of a bill now before Congress.

This is a real "give-away" bill. It would give an individual title to a mile-wide strip of the Continental Shelf running 8½ miles along California's seaward boundary in the Long Beach area. Title to the area would carry with it "full property rights of natural resources and the industrial, economic, and business possibilities of location." The only limitations would be the rights of navigation and a first call by the Government on the natural resources.

The bill was introduced by Rep. Craig Hosmer "by request." It is based on a claim to the area filed with the Interior, State, and War departments by Olin S. Proctor of California in 1939. He claims title "by prior right, discovery and prescription."

electric power, and contract work, was $1,494,474,000 in 1947. It had risen to $1,997,160,000 by 1953.

The Census Bureau calls this "value added by manufacture." The bureau made the estimate last week based on sample surveys and the 1947 census of manufacturing.

Tidelands Fight Resumes

WASHINGTON. — Congressmen looking for federal funds to support schools are taking covetous peeks at the state-owned tidelands.

A number of bills have been introduced to dedicate revenues from oil and gas development on the outer Continental Shelf for aid to education. Last week, Rep. John E. Fogarty of Rhode Island gave the legislation a new twist.

Fogarty has introduced a bill which would nullify the 1953 action of Congress in returning marginal submerged lands to the coastal states. He would restore federal control over the tidelands, making them subject to the Outer Continental Shelf Lands Act.

Fogarty says the tidelands reserves should not be permitted to "fatten the coffers" of a few states. He charged that this puts other states at a disadvantage. Rhode Island was one of the two states—Alabama was the other—that tried to get the Supreme Court to pass on the return of the tidelands 2 years ago.

Mergers Under Scrutiny

WASHINGTON.—The Department of Justice is poised for a new drive against monopoly.

Atty. Gen. Herbert Brownell, Jr., served notice last week that he is ready to move against monopoly-making mergers before they get started. He backed up his words with a suit to prevent the merger of two distilling companies. It was the first such suit filed under the antimerger provisions of the Clayton Act since it was enacted in 1950.

Mergers in every major industry are being watched by the department. Many companies submit their merger plans for approval before going through with them. Some have been approved. The department has suggested that others be dropped.

The purpose of the Clayton Act is to reach monopolies and restraints before they are fully developed, Brownell said.

"There is no necessity for the department to wait until an industry is dominated by one company before action is taken against a merger or acquisition," he added.

WEST COAST

Offshore Break Seen

California tidelands should be opened by end of year

LOS ANGELES.—One of the West Coast's leading geologists thinks the state and federally owned tidelands off California will be opened for leasing before the end of the year.

A. C. Rubel, exploration and development vice president for Union Oil Co., made this prediction at a meeting of the Petroleum Equipment Suppliers Association. However, Rubel said it will probably be 2 or 3 years before any significant drilling develops.

The Union official estimated oil companies have spent $16 million on seismic and core-drilling studies in the tidelands.

He said some of the offshore legislation before the state legislature will probably be adopted this year to liberalize the state's leasing laws. Under current statutes, the State Lands Commission can grant leases only when drainage exists or is imminent.

The procedures for obtaining leases on federal submerged lands beyond the 3-mile limit also should be cleared up this year, he said.

Industry bills endorsed . . . The Southern California Council of the State Chamber of Commerce has thrown its support behind some of the offshore measures before the legislature.

During a recent meeting, T. C. Moroney, Honolulu Oil Corp., San Francisco, stressed the need for California to revise its offshore-leasing laws. He said laws opening the tidelands to exploration and development are needed for California to keep pace with the growing demand for oil.

Second Nevada Well Tested

ELY, Nev.—Nevada's Eagle Springs oil pool apparently will soon be confirmed.

A drill-stem test at Shell Oil Co.'s ¼-mile southwest stepout indicates the state will have its second oil well in Nye County. The test at 35-35 Eagle Springs recovered 6,000 ft. of 29°-gravity crude in 2½ hours from the interval 6,606-78 ft.

Drilling Protests Invited

LOS ANGELES.—The State Lands Commission has called a meeting here February 24 to hear objections of Huntington Beach citizens to any drilling islands which might be placed near its beaches.

The commission has asked for bids on two state leases offshore from California's most feverish townlot drilling boom. If too much criiticism develops, drilling might be confined to slant holes from upland drill sites. Parcels offered for bidding consist of 640-acre and 320-acre tracts.

Offshore Well Completed

LONG BEACH.—Monterey Oil Co. has completed a third well from its filled-earth drilling island 1½ miles offshore from Seal Beach.

Other than total depth, 7,112 ft., no details were made public. It probably was slanted to some portion of the 1,200-acre state lease Monterey jointly holds with The Texas Co., however. A depth of more than 3,500 ft. had been reached last week on the fourth well.

New Geological Technique

Cutting a ribbon to open a new building seemed inappropriate to Billings, Mont., geologists. To open the new petroleum field station of the Montana Bureau of Mines and Geology last week, they called on Mayor Earle Knight to shatter a long well core laid across the front steps. The brief ceremony was a first-day feature of the fifth annual meeting of the Rocky Mountain section of the American Association of Petroleum Geologists. The new field station will be used to file and exhibit Montana well cuttings and core samples.

Ammonia "Hot" in Canada

One plant announced, four planned; heavy fuel oil, byproduct hydrogen considered as feed stock

MONTREAL.—Quebec Ammonia Co., Ltd., has started what may become a major ammonia boom in Canada.

The company announced last week that it had let an $8,500,000 contract to Lummus Co. of Canada for a 125-ton plant at Contrecoeur, near here. The firm will use heavy fuel oil for a raw stock and will also make nitrogen solutions.

A number of other synthetic-ammonia projects are on the fire in Canada. Four plants are known to be under consideration, but it is not yet known how many will be built.

In the west, New British Dominion Oil Co. has been trying to finance a 100-ton ammonia plant for several months. The plans are now understood to be active again for the Lake Pokowki area of southeastern Alberta, where New British Dominion has gas reserves.

In Quebec, Montreal looms as a lucrative site for a synthetic-ammonia operation. The raw materials are here, and the first plant to be built would enjoy definite marketing advantages in the industrial and agricultural region. The most likely raw stocks are heavy fuel oil and reformer hydrogen, with natural gas a more remote possibility, pending the completion of the Trans-Canada Pipe Lines, Ltd., line.

Feed stock available . . . Heavy fuel oil will be available from three of the four refineries in the Montreal area. The fourth, a new refinery being built by Canadian Petrofina, Ltd., will incorporate fluid coking.

Byproduct hydrogen will be available in the area before the end of this year. British American Oil Co., Ltd., will build a 13,000-bbl. per day Catformer at the Montreal East refinery, and McColl-Frontenac Oil Co., Ltd., has scheduled a new Platforming unit for its local refinery. Petrofina's new refinery will include a 3,600-bbl. per day Ultraforming unit. These three units will be capable of producing about 15 million cubic feet per day of hydrogen-rich tail gas.

Some of this hydrogen will be utilized in catalytic hydrogen treating units at the Petrofina and McColl-Frontenac plants, but immediate requirements will not take up all the hydrogen produced in the reforming operations. It is likely that Imperial Oil, Ltd., and Shell Oil Co. of Canada, Ltd., will also install catalytic reforming units at their Montreal East refineries in the not-too-distant future.

If they do, there will probably be enough uncommitted reformer hydrogen around Montreal to make 300 tons per day of synthetic ammonia. Whether the refiners would be willing to commit their hydrogen to ammonia manufacture is a question, however. The trend in thought is now swinging toward heavier internal use in the upgrading of middle and light distillate stocks.

Three interested . . . Three other companies are understood to be interested in Montreal ammonia. They include: Shell, Dow Chemical Co. of Canada, and Canadian Industries, Ltd. Of these, two are already in the ammonia business, or close to it. Dow operates a 100-ton per day plant at Sarnia, Ont., and Shell's U. S. affiliate Shell Chemical Co. makes ammonia in California. Robert Campbell, who is interested in Quebec Ammonia, heads a group planning to build the 200-ton per day plant recently announced by St. Paul Ammonia Products Co. at St. Paul, Minn.

Canada has two other ammonia plants now in operation. Both are located in the west and are based on natural gas. Consolidated Mining & Smelting Co. of Canada, Ltd., has expanded capacity of its Calgary plant from 250 to 390 tons per day of basic ammonia. Sherritt-Gordon Mines, Ltd., recently doubled the original 75-ton per day plant operated at Fort Saskatchewan, Alta.

Pembina Price Boosted

CALGARY. — Imperial Oil, Ltd., major purchaser of Alberta crude, last week boosted its price for Pembina crude to $2.48 a barrel, an increase of 12 cents.

Half the 12-cent boost is an actual price increase. The other half is a 6-cent reduction in the tariff on Pembina Pipe Line Co.'s 72-mile line from the field to Edmonton.

Imperial announced price increases of 1 cent a barrel in Excelsior crude and ½ cent for crude from Acheson-Stony Plain, Armisie, Golden Spike, Leduc-Woodbend, and Redwater fields. All are slight reductions in pipeline tariffs.

A.A.P.G. Officials Hold Sidewalk Meeting in Billings

Organization officials and speakers at the fifth annual meeting of the Rocky Mountain section of the American Association of Petroleum Geologists are shown here outside the Fox Theater in Billings, where working sessions were held. Registration topped 1,600 on February 15, opening day of the meeting. Left to right in the picture are Robert Dott, of A.A.P.G. headquarters, Tulsa; G. C. Burton, Jr., El Paso Natural Gas Co., Farmington, N. M.; R. P. Swirczynski, Houston Oil Co. of Texas, Casper, Wyo.; W. B. Gallup, Royalite Oil Co., Ltd., Calgary; A. J. Crowley, Continental Oil Co., Denver; Wilson M. Laird, North Dakota Geological Survey, Grand Forks, N. D.; Edward Koester, president of A.A.P.G., Wichita, Kans.; and R. C. Spivey, Shell Oil Co., Los Angeles.

Higher Levy Asked

Bill would hike Colorado's tax to 5 per cent of value

DENVER.—A bill calling for a 5 per cent severance tax on oil and natural gas at the wellhead is being prepared for the Colorado Legislature.

Gov. Ed C. Johnson 2 weeks ago threatened the oil industry with a "real tax" if it continued to protest payment of the present graduated tax on gross income from oil and gas production *(The Oil and Gas Journal, February 7, page 78).*

Sen. Robert L. Knous, Denver Democrat and co-author of the proposal, said the new tax would double the amount of money the present tax is netting the state. Receipts from the current levy yield approximately $2,500,000 a year.

The new bill would charge 5 per cent of the value of oil and gas produced. Based on oil production of some 45,000,000 bbl. last year at an average of $2.50 a barrel, the tax would bring in more than $5,500,000.

"We think this is a fair and equitable tax," Knous said. "It wouldn't discourage exploration and would clear up the present situation where oil companies are paying a tax under protest and threatening court suits to get their money refunded."

A similar proposal touched off a bitter fight in 1949 before it was defeated.

Gasoline Prices Questioned

HELENA, Mont.—The Montana Legislature has been asked to appropriate $20,000 for an investigation by the attorney general of methods used in fixing retail gasoline prices in the state.

Rep. Lee Schumacher, a Democrat, described Montana gasoline prices as "the highest in the United States" when he introduced the measure.

The lawmaker said gasoline refined and produced in Montana is priced under the Tulsa formula which assesses freight charges from Tulsa to Montana even though the product never leaves the state.

The present cost of gasoline to Montana consumers averages 34 cents a gallon. Schumacher contended the fuel costs the distributor 26.1 cents a gallon, and added:

"It appears the producers are receiving considerable excess profits to which they are not entitled."

He said the assessed freight rate from Tulsa to Helena is 6.6 cents a gallon, but "certainly the Tulsa formula in excess of 4 cents a gallon should not be applied."

Flaring Controls Asked

CHEYENNE, Wyo.—The Wyoming Oil and Gas Conservation Commission has set March 2 for hearing on the petition of operators in the Greater Clareton fields of Weston County to close down wells producing at gas-oil ratios in excess of 5000:1.

The petition was formulated by the Greater Clareton Producers Committee, a recently organized group which hopes to encourage the erection of a gasoline plant in the fields.

This move to halt the excessive flaring is the committee's first action in that direction. Its chairman, James P. Sloss, Denver independent, has announced that his group is negotiating with Davis, Heineman & Wagner for the erection of a 50,000,000 cu. ft. per day gasoline plant to serve not only the Clareton fields but the older Weston County producing area at Mush Creek and Skull Creek.

Wyoming Tax Hike Unlikely

CHEYENNE, Wyo.—A bill proposing a 2 per cent production tax on mineral resources, including oil, is considered dead in the waning days of the Wyoming legislative session.

The House of Representatives has postponed indefinitely any action on the measure. The chamber earlier had tagged a "do not pass" recommendation on the bill by a vote of 39-10.

Petroleum, mining, and cement interests have voiced strong objections to the measure.

William Ballin, district representative of the Rocky Mountain Oil and Gas Association, declared the oil industry now is paying more than 30 per cent of the state's taxes. He charged the proposed levy would be "excessive, discriminatory, and unfair."

John Gee, representing Ohio Oil Co., said the tax would single out one particular industry or group of industries in violation of the Wyoming Constitution, which provides that taxation must be equal and uniform.

Gasoline Plant Opening Set

FORT MORGAN, Colo.—A natural-gasoline plant being built 17 miles south of here by Pure Oil Co. is scheduled to go on stream by June.

The plant is designed to process 12 million cubic feet of gas daily. It will produce from 1 to 1½ gal. of liquid per 1,000 cu. ft. of gas.

It will take gas from about 185 wells in the Adena field, where 97 per cent of the operators are owners of the new plant. Pure will operate the unit with Ray Birmingham as superintendent.

Shale Fight Warms

Politicians oppose plan to shut down plant at Rifle

WASHINGTON.—Congress will get a chance to say whether the Interior Department's oil-shale plant at Rifle, Colo., shall be closed.

A departmental survey committee recommended last year that the plant be closed. The National Petroleum Council approved it last month. Congress members from the Rocky Mountain states now are working to keep it open.

No funds for continuing the Rifle plant after next June 30 were asked in the 1956 budget. The present appropriation will not cover the cost of mothballing the plant if it is closed. So the department will have to ask a supplemental appropriation for that work, and the Rocky Mountain delegations will counter with a request for money to keep the plant going.

There is still a need for government research even though oil companies are planning their own shale-oil studies, Sen. Eugene D. Millikin of Colorado told The Oil and Gas Journal.

Millikin pointed out that the results of the government's research are available to the companies and may be a help in their own studies.

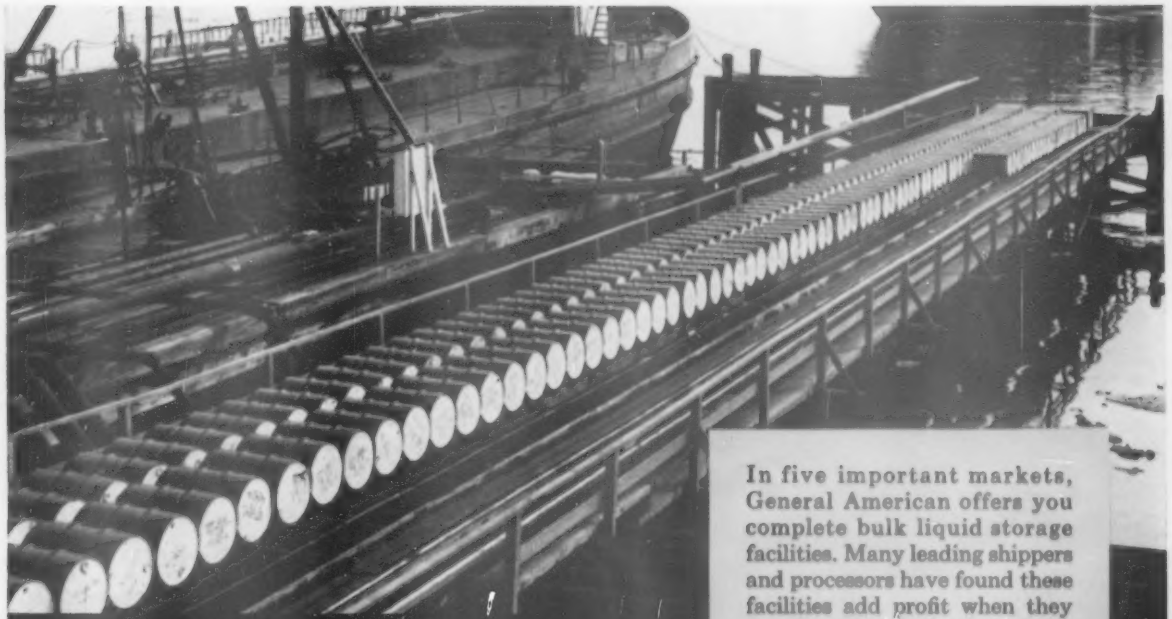
If the plant is closed a multimillion dollar investment in a new retort which went into operation only 2 months ago will be lost, supporters of the Rifle research charge.

Water Flow Cut Off

MALTA, Mont.—The flow of 105° F. sulfur water threatening to undermine a rotary rig 10 miles southeast of here has been halted.

The rig was skidded off location and casing cemented at 1 Ulrich, where the water blew out from 3,500 ft. It flowed 50,000 bbl. daily for 3 weeks.

Officers of DeKalb Agricultural Association, which was drilling the wildcat, said blowout preventers stopped the initial flow, but the water channeled underground causing geysers as far as 50 ft. from the rig.



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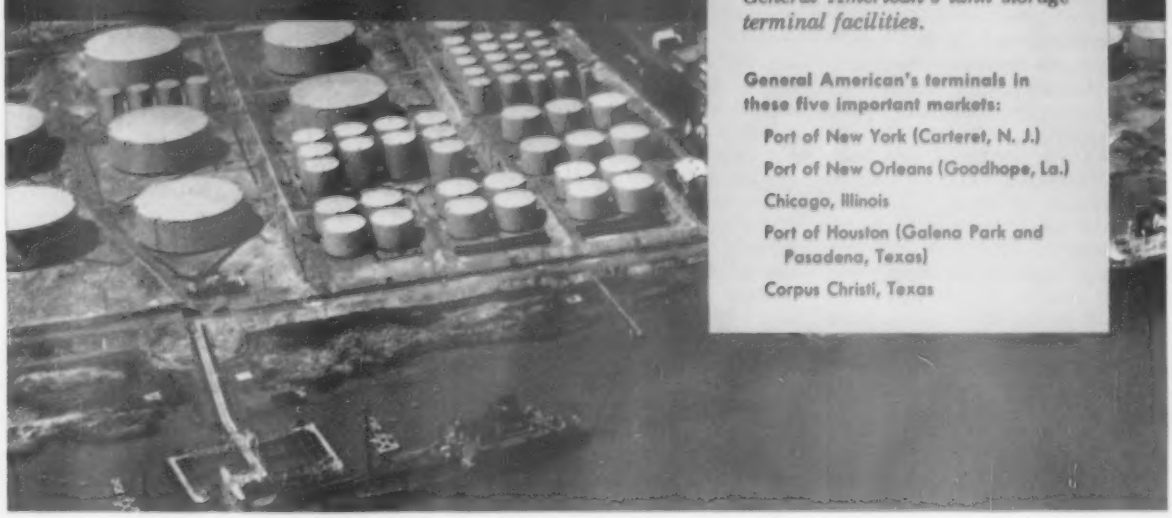


Creole Expands Refinery

Fluid Hydroformer at plant in western Venezuela is Latin America's first modern catalytic reforming unit

CATALYTIC reforming, already the fastest-spreading new refining process, will make its advent in Latin America in April when Creole Petroleum Corp. brings a fluid Hydroformer on stream at Amuay in western Venezuela.

The 10,000-bbl. daily Creole unit is part of an expansion and improvement program started at the Amuay refinery in 1953. The company also is completing additional distillation facilities to raise total crude capacity to 135,000 bbl. per calendar day.

A score or more catalytic reforming units have been or are about to be completed in the Eastern Hemisphere, but the Creole fluid Hydroformer is the first modern catalytic reformer to be built in Latin America. The Argentine War Ministry has for several years had an older type fixed-bed Hydroformer for toluene production. The new Creole unit was designed and engineered by Standard Oil Development Co., developers of fluid Hydroforming. It will be a low-octane, heavy naphtha feed.

Reformate output from Amuay will be split three ways. A relatively small amount will go for 91-octane aviation gasoline used in Venezuelan air transport, some will be blended into 96-octane premium motor gasoline for the Venezuelan market, and the surplus will be exported to the Aruba refinery of Lago Oil & Transport, Ltd., for use in making 100 to 115-grade aviation gasoline. With the Amuay unit in operation, Lago will no longer be required to buy aromatics on the Gulf Coast for its aviation gasoline plant.

Other facilities . . . The new distillation equipment consists of a 70,000-bbl. daily atmospheric and vacuum unit. The objective in this phase of the program is partly to expand output of middle distillates. Heavy gas oil from the vacuum unit will be shipped to Aruba for catalytic cracking feed. The Lago plant will be able to take a narrower cut in its own units and thus use the lighter gas oil in marketable heating oil.

The new distillation facilities, added to the present 65,000-bbl. daily atmospheric and vacuum unit, give the Amuay refinery a crude capacity rivaling the 145,000-bbl. basic rate at the nearby Cardon refinery of Cia. Shell de Venezuela, Ltd. Cardon, however, has a crude intake of nearly 170,000 bbl. daily, counting crude charged to the thermal cracking unit.

The atmospheric end of the new 70,000-bbl. unit at Amuay has been running since October. The vacuum side is scheduled to be completed early in May. The over-all Amuay expansion program, for which Foster Wheeler Corp. was the contractor, called for a third 200,000-lb. boiler serving the refinery. Housing for 30 additional senior staff members also has been built.

Creole began planning the Amuay refinery shortly after the end of World War II, and actual construction was started in 1947. Creole now has an investment of about $150,000,000 in Amuay, of which $35,000,000 was spent in the recent expansion.

Both the Shell and the Creole refineries are on the wind-swept Paraguana Peninsula which jets out into the Caribbean off the coast of western Venezuela. Crude is moved to the plants and their adjacent export terminals by large-diameter lines from Lake Maracaibo fields. Creole is now pumping about 500,000 bbl. daily through its two 24 and 26-in. lines.

Drilling Record Set

Aramco wildcat is dry, but breaks Arabian depth mark

A NEW depth record—but no oil—has been achieved in Arabian American Oil Co.'s rank wildcat in the Rub al Khali Desert of southeastern Saudi Arabia.

The hole has reached 12,789 ft. to become the deepest well in Saudi Arabia and one of the deepest ever drilled in the Middle East. At this depth, the well is reported still in Mesozoic formations. Testing has been negative.

The well not only has the distinction of being Saudi Arabia's deepest but also probably holds some sort of record as being one of the world's most remote and isolated wildcats. The location, about 200 miles south of the Uthmaniyah section of the Greater Ghawar field, is in the northern edge of the great, waterless, sand desert which covers southeastern Saudi Arabia.

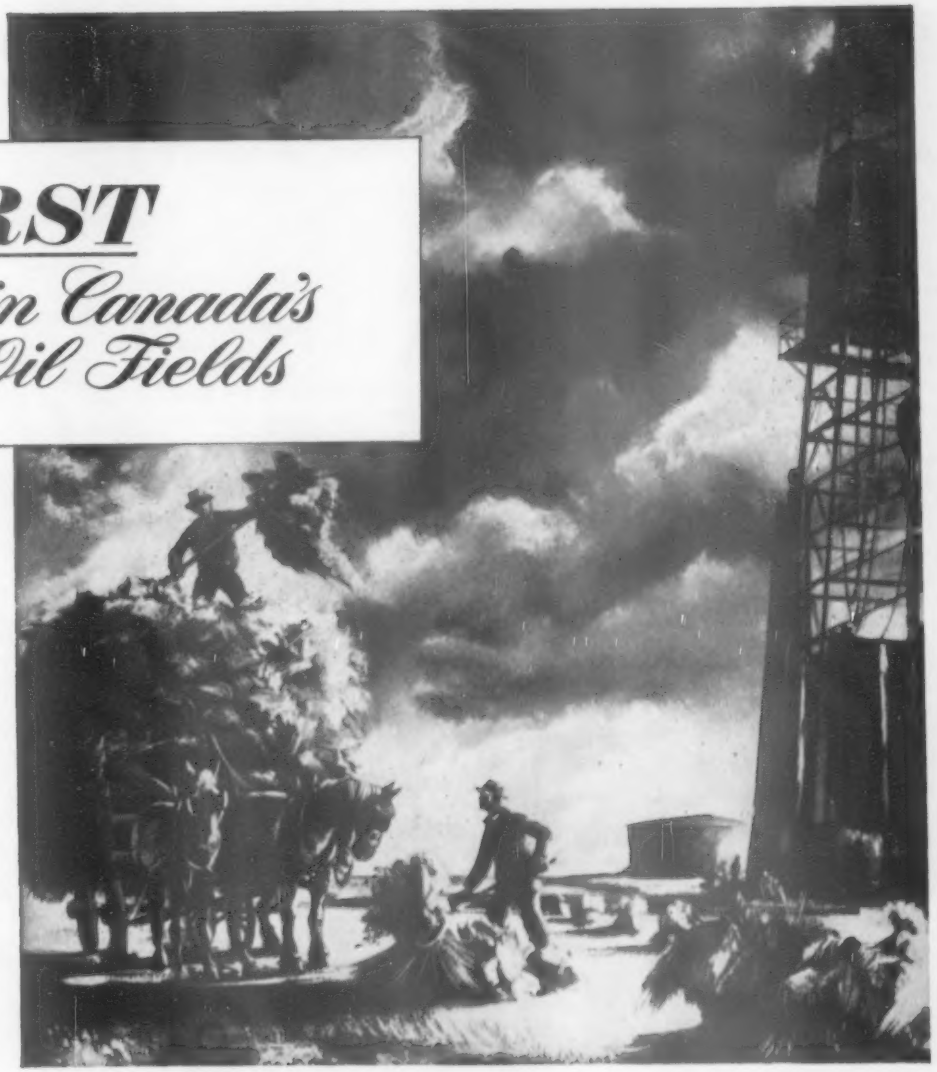
Aramco has done core drilling and geophysics in this region but the current well is the first test. The name, Rub al Khali, means "Empty Quarter." The desert has been crossed only by a handful of western explorers.

Offshore field . . . Aramco has another deep well under way in its offshore field, Safaniya, in the Persian Gulf near the Neutral Zone border. This well, Safaniya 17, is in the center of the field.

Safaniya has 16 completed wells. All but 2 were drilled offshore from a large diesel-electric drilling barge which the company bought from Creole Petroleum Corp. 5 years ago.

Safaniya will be brought on production when gathering and shipping facilities, including a line to Ras Tanura, are completed. Safaniya was discovered in 1951. It produces 27°-gravity crude from Cretaceous sandstone at a depth of about 5,600 ft.

FIRST
in Canada's Oil Fields



The Royal Bank of Canada, Canada's largest bank, whose clients include many of the most prominent firms in the field, offers exceptional services to the petroleum industry. Its Oil and Gas Department, manned by experienced officers in close touch with the situation, provides information, guidance and practical aid to prospective entrants.

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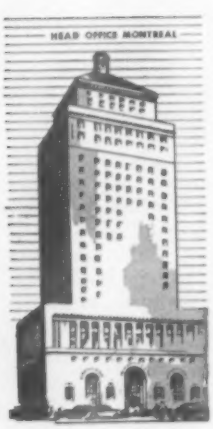

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Price Fixing Hinted

Operators in Europe worry about possible U.N. action

A REPORT indicating oil price-fixing arrangements in Europe reportedly has been drawn up by the United Nations' Economic Commission for Europe.

The document, which now carries the "restricted" label, is understood to be in the hands of interested governments. It is due to be considered when the commission's coal committee holds closed meetings in Geneva, March 9 and 10.

If the report is released, it will be the second time the U.N. group has taken a swipe at the petroleum industry. Last summer it published a study on coal and black oils in Europe. Oil analysts contended grossly underestimated possibilities of expanded use of fuel oil in Europe and gave little attention to the way in which some governments throttled black-oil consumption in favor of oil.

In Geneva where the Economic Commission for Europe has headquarters, sources reported that the report carried the implication that oil prices in Europe would be lower were it not for price fixing. On the basis of these unofficial reports, oil interests in Europe are showing concern.

Whether the study will ever be published is not known. It is considered to be an elaboration of the coal-oil analysis of last summer. Another study is being prepared by the commission on electrical energy from sources other than coal and oil.

Coal Synthesis Plant Planned

Another $100,000,000 project for making synthetic petroleum from coal synthesis is shaping up in India.

The Indian Government has "accepted in principle" the report of a government committee in favor of such a plant. Head of the group was K. D. Malaviya, natural resources minister.

As worked out by the committee, the plant would produce about 6,000 bbl. daily of liquid hydrocarbons. About 4,300 bbl. of this (215,000 tons) would be motor gasoline, diesel fuel, and lubricants. The rest would be aviation gasoline.

The project will cost between $110,000,000 and $121,000,000. The idea for a synthetic plant in India was first advanced several years ago. British, German, and American firms are seeking engineering and supply contacts.

The South African Government's SASOL company recently completed a $92,000,000 plant at Coalbrook in that country. The South African project was economical because of the low-cost, easily mined coal, and the high transportation charges for imported oil.

Digboi Production Raised

Assam Oil Co., Ltd., (Burmah Oil Co., Ltd.) will raise its production from Digboi field in northeastern India to a new peacetime high of 5,400 bbl. daily during 1955.

The higher output is being made possible by good results in East Kharjan, a recent eastward extension of the field. The most recent well in the area has proved to be one of the best producers in Digboi's history, though drilling further to the east has failed to find production.

In its new field at Nahorkatiya about 20 miles to the southwest, the No. 5 well was a disappointing failure at 10,945 ft. total depth. Nahorkatiya 6 is now drilling. The earlier four wells are rated at about 500 bbl. daily each, and the crude is moved to the Digboi refinery through a newly completed pipeline. However, the company recently disclosed that the No. 3 well stopped flowing in mid-December and that artificial lift is being studied.

The older Digboi field, which provides most of the company's production, dates back to 1890. It has some 30 flowing wells and about 590 on pump and gas lift, plus another 190 shut in.

Mafia Island Test Spudded

The first well in a Royal Dutch-Shell and British Petroleum Co., Ltd., program in British East Africa has started on Mafia Island off the coast of Tanganyika. The wildcat may go to 12,000 ft.

Bombay Plant Opens

Burmah-Shell's 40,000-bbl. refinery is India's biggest

THE second and largest of three new refineries in India has been brought on stream near Bombay.

It is the 40,000-bbl. daily plant of Burmah-Shell Refineries, Ltd., which has been under construction for 2 years. The refinery's distillation units have been placed in operation and other process facilities will be started in the next few months.

The Burmah-Shell refinery is at Trombay Island about 10 miles from Bombay. Nearby is the 25,000-bbl. daily refinery of Standard-Vacuum Refining Co. of India, Ltd., which opened last July. India's third new refinery is a Caltex project on the East Coast. Preliminary work just started on this 10,000-bbl. daily plant.

These three refineries will meet most of India's requirements for major petroleum products. The output of the new Burmah-Shell refinery alone will meet roughly half the Indian demand for gasoline, kerosine, diesel, furnace oils, and asphalt.

The new refineries will operate on imported crude largely from the Middle East. India's older refinery, the Assam Oil Co., Ltd., 7,000-bbl. daily plant, processes India's only production from Digboi and the newer Nahorkatiya field. The Assam company is a subsidiary of Burmah Oil Co., Ltd., which with Royal Dutch-Shell owns the new Bombay refinery.

The Burmah-Shell refinery at Bombay includes vacuum distillation, catalytic cracking, gas separation, product treating, and asphalt manufacture. Crude for both the Burmah-Shell and the Standard-Vacuum refineries is offloaded at Butch Island and moved through submarine pipeline to the refineries. Some products are sent to Butcher Island for tanker shipment elsewhere in India.

Cat Poly Unit Finished

Ste. Industrielle Belge des Petroles has completed a catalytic-polymerization unit at its Antwerp refinery.

The 3,000-bbl. unit soon will be followed by a 10,000-bbl. fluid catalytic cracking plant and additional distillation facilities.

Crude capacity of the refinery will be raised from 36,000 bbl. daily (1,800,000 tons a year) to about 56,000 bbl. daily (2,700,000 tons) by the new construction. The refinery is owned by British Petroleum Co., Ltd. and Cie. Financiere Belge des Petroles (Petrofina). It was built about 3 years ago.

Shell Posts Prices

Venezuelan crude, products from two refineries listed

SHELL has begun posting prices for crude oil in Venezuela and for products from both the Curacao and the Cardon refineries.

Shell is the second company to post Venezuelan crude prices. Creole started issuing public price bulletins in July 1952. Shell and Creole account for about 75 per cent of Venezuela's output.

An announcement by Cia. Shell de Venezuela said published quotations are needed because of the "increasingly strong competition among the producing companies in the various exporting countries of the world."

C.S.V. posted prices for six crudes from western Venezuela, f.o.b. Cardon, and two eastern Venezuela crudes, f.o.b. Puerto La Cruz. They were:

...From Puerto La Cruz: San Joaquin, $3.04 for 41.0°-41.9°; Oficina, $2.82 for 32.0°-32.9°.

...From Cardon: Paconsib, $2.70 for 33.0°-33.9°; Lagomar, $2.45 for 29.0°-29.4°; Mara, $2.40 for 29.5°-29.9°; Cabimas, $2.20 for 22.0°-22.4°; Lagunillas, $1.90 for about 15°; and Bolivar district heavy, $1.75 for 12.5°-12.9°.

Shell's prices set a 2-cent change for each degree gravity for San Joaquin, Oficina, and Paconsib crudes; 2½ cents per half degree for Lagomar, Mara, and Cabimas, and 0.35 cent for each half degree for heavier crudes except Lagunillas, which is posted flat.

Creole has the same price for San Joaquin and Oficina crudes, but shows $2.58 for 30.0°-30.9° Mara crude, and a flat $1.85 for Lagunillas.

Shell's Colon Development Co., Ltd., posted $2.99 for 37.0°-37.9° West Tarra crude and $2.58 for 30.0°-30.9°, Las Cruces-Los Manueles crude, both with a 2-cent per degree gravity change.

C.S.V.'s export prices from Cardon included the full range of products. Motor gasoline of 70-72 (motor-method) octane was listed for 9½ cents, and Bunker C at $1.95. The export prices of products from the Curacao, N.W.I., refinery were posted by Shell Petroleum Co., Ltd., and included: 115-145 avgas, 17 cents; 70-72 octane (motor-method) motor gasoline, 9½ cents; and Bunker C, $1.95.

Israeli Pipeline Planned

A 58-mile products line is planned from the Haifa refinery to Tel Aviv to give a more economical distribution of the refinery's output.

Shell and British Petroleum Co., Ltd., own the 83,000 bbl. refinery. However, neither has signed up to help build the line. Israeli interests are backing the line. They include the government, which will own 10 per cent, and the semi-governmental Israel Fuel Corp., Ltd.

The refinery once was an important export plant. But since 1948 it has been operating at only about a quarter of capacity using Venezuelan crude.

Rubber Plant Deals Signed

Italy's state oil and gas organization, Ente Nazionale Idrocarburi, has signed contracts with two large United States companies for help in building synthetic-rubber facilities at Ravenna.

One agreement is with Union Carbide & Carbon Co., which will act as consultant in the design and construction of a butadiene plant. The other is with Phillips Petroleum Co. to do the engineering and to give technical assistance in the building of a copolymer plant.

These two plants will cost the equivalent of about $75,000,000, which will be raised from Italian sources. The output will meet about 60 per cent of Italy's rubber needs. Natural gas produced by ENI in the Po Valley will be used as a feed stock.

The butadiene plant will produce enough butadiene for 30,000 tons of GR-S type synthetic rubber and 350,000 tons of nitrogen fertilizers a year. It is scheduled for completion in about 2 years. The plant will be licensed to use Carbide's recently announced partial-oxidation process which reacts methane and oxygen to produce acetylene.

The projects will be carried out by Azienda Nazionale Idrogenazione Combustibili (ANIC), a subsidiary of ENI.

East Pakistan Search Renewed

DESPITE several costly dry holes, Pakistan Petroleum, Ltd., has started another deep test in its long-range program aimed at finding the first oil production in East Pakistan.

The new wildcat is in the Sylhet area. Pakistan Petroleum's extensive gravity work in East Pakistan in 1952-53 showed, among other results, a promising structure northeast of the town of Sylhet. After a detailed seismograph survey, a location was selected near Haripur.

Site preparation has been going on since August. About 80 acres of hilly jungle country was leveled, and an approach road constructed. Heavy rains slowed the work. Nineteen bridges along the route to the well were strengthened before the rig was moved in.

Pakistan Petroleum is a subsidiary of Burmah Oil Co., Ltd. It was formed after the India-Pakistan partition and has continued exploration previously conducted by B.O.C. The government of Pakistan took a 30 per cent interest in the company after private investors in Pakistan failed to subscribe to the shares offered.

The rig at Sylhet is capable of drilling to 13,000 ft. In a speech at the spudding-in ceremony, B. R. Kemp, P.P.L.'s managing director, said the new well, together with the gravity party working along the rivers of the Chandpur area, is evidence of the company's determination to continue its search for oil in East Pakistan.

P.P.L.'s previous deep wells in East Pakistan at Patharia and Patiya were failures. However, about 2 years ago in West Pakistan, the company discovered the Sui gas field with several trillion cubic feet of reserves. A pipeline to move gas to Karachi is being built.

HIS EXCELLENCY Mr. Shahabuddin, acting governor of East Pakistan, started the controls on the rig that is drilling a wildcat in East Pakistan. He received a helping hand from Driller Gulzar Ahmad. Looking on are B. R. Kemp, managing director of Pakistan Petroleum, Ltd., which is drilling the test, and the governor's aide.

Gas Line Finished

Italian company completes new outlet from Po Valley

A 102-MILE line extending from Cortemaggiore field to Genoa has been completed as the latest addition to the growing system of natural-gas pipelines in northern Italy.

The 16-in. line was constructed for the Italian Government organization which by law holds a virtual monopoly on oil and gas operations in the Po Valley of northern Italy. Postwar development has made this area the richest source of gas in Western Europe.

The line cost more than six billion lire, or about $10,000,000. It is designed to move about 102,000,000 cu. ft. daily.

The new trunk reaches a maximum altitude of 2,400 ft. in crossing the Apennines at Passo dell Bocchetta. It crosses 70 roads, 10 railroads, and 250 streams and rivers.

Other projects . . . Of the 620 miles of gas lines recently listed as under construction in northern Italy, the Cortemaggiore-Genoa line was one of the major projects. The network of lines in northern Italy totals about 2,500 miles.

A recent estimate placed Italian reserves of natural gas at about 3½ trillion cubic feet. This is equivalent to 43½ years' production at the 1953 rate of about 223,000,000 cu. ft. daily. In the next few years, however, production is expected to reach some 485,000,000 cu. ft. daily.

The Italian gas lines are handled by Soc. Nationale Metanodetti, which is a part of the government oil and gas organization, Ente Nazionale Idrocarburi (E.N.I.). Plans to extend the network of trunk lines into central Italy are under study.

Production . . . In the Catania district of east-central Sicily, the Italian state-controlled company, MISO, has drilled nine wells, eight of which were completed as gassers. An output of about 2,800,000 cu. ft. daily with a high CO_2 content has been developed. In southeast Sicily, four gas wells have been completed west of Lentini. Plans for construction of a nitrogen-fertilizer plant are being talked.

Tests Planned in Borneo

Another section of the Sarawak coast in British Borneo has been selected for the next wildcatting effort of Sarawak Oilfields, Ltd., (Royal Dutch-Shell).

The company plans three exploratory wells in the coastal Balingian River basin. The first test will be drilled to about 5,000 ft.

Sarawak Oilfields operates the Lutong refinery which uses crude from Seria field operated in the nearby Brunei territory by another Shell company, British Malayan Petroleum Co., Ltd. Sarawak's own Miri field is now nearly depleted. *(The Oil and Gas Journal, December 6, 1954, page 99.)*

The Sarawak company has recently been doing exploratory drilling in the Suia area on the coast about 50 miles from Miri.

International Briefs

Europe's next completely new refinery may be built in Ireland. Esso Petroleum Co. of Ireland (Jersey Standard) Caltex Ireland, Ltd. (Standard of California and The Texas Co.), and Irish Shell have agreed in principle to organize a company for the operation of a jointly owned refinery in Ireland, according to the Eire minister for industry and commerce, W. Norton. Ireland, which has no refining facilities at present, imports an average of about 20,000 bbl. daily of products.

A new small-size catalytic reformer is going in at the refinery of the Italian company, ILSEA, at Valmadrera north of Milan. It is a Catformer of 500 bbl. daily capacity. The unit being built by the Italian engineering and construction company, Technider-Idrocarburi e Derivati. The refinery itself has a crude-oil capacity of about 2,400 bbl. daily.

Shell has spudded the first wildcat on its marine concession off the coast of Qatar in the Persian Gulf. The well, about 5 miles from shore, is being drilled from a 1,900-ton movable platform completed last fall *(The Oil and Gas Journal, November 1, page 74).*

Latest link in Colombia's growing network of products pipelines has been inaugurated between Puerto Berrio on the Magdalena River and the industrial city of Medellin. The 112-mile, 6-in. trunk was built by Williams Brothers for the departmental government at a cost of about $4,400,000. At Puerto Berrio it connects with another line leading from the newly expanded Barrancabermeja refinery.

Crude shipments from the Sidon, Lebanon, terminal of the Trans-Arabian Pipe Line Co. line dropped slightly in January to an average of 311,581 bbl. daily. The December average was 328,640 bbl. daily. The average for 1954 was 318,823 bbl. daily.

Base Metals Corp., Ltd., will begin exploratory work in Jamaica by the end of March. The company, which controls exploratory rights on 4 million acres, will drill two exploratory wells.

Nippon Petroleum Co. is completing a modernization and expansion program at its Yokohama refinery. The company is owned by California Texas Corp. and Japanese interests. New units are: crude topping of 6,750 bbl. daily design capacity; vacuum distillation, 4,500 bbl. daily; gasoline stabilizer, 2,180 bbl. daily; Model IV fluid-catalytic cracking with gas plant, 5,000 bbl. daily; propane deasphalting, 2,890 bbl. daily; benzol-acetone solvent dewaxing, 2,177 bbl. daily; and clay contracting, 560 bbl. daily. Crude capacity of the refinery is 18,000 bbl. daily.

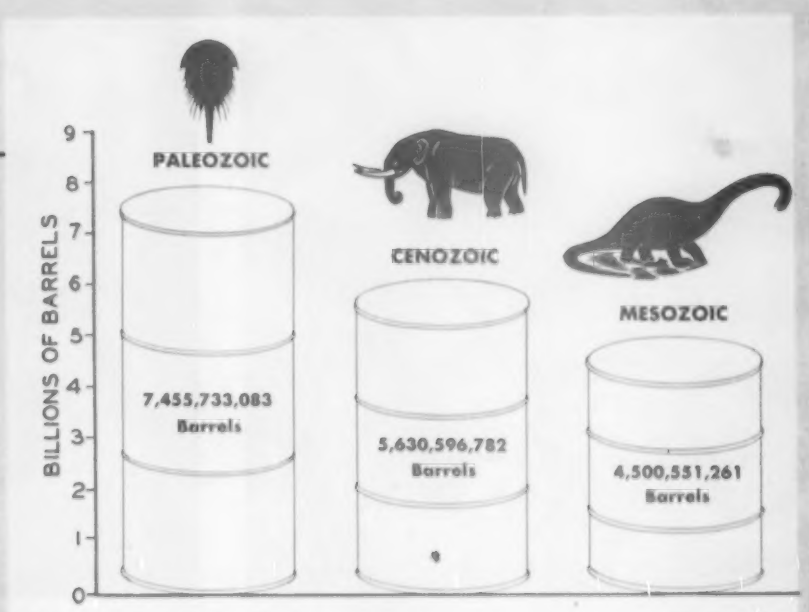
Handy Wall Chart Included in This Issue

A multicolor correlation chart for all Texas producing formations accompanies this issue as a folded insert. It shows, for each county, the formations which are oil productive, and the name of a typical field in each county. Five maps on the chart display the areas in which the formations produce. (Extra copies 50 cents, Reader's Service Dept., Box 1260, Tulsa.)

ALSO . . . "A Report on Texas Oil Resources"—Four pages of tabular data from the new report, "The Oil Resources of Texas," just released by the Texas Petroleum Research Committee and University of Texas. Starts on page 115.

by
Frank J. Gardner
Exploration Editor

. . . from Cambrian through Quaternary



Texas Oil Flows From Rocks Of Every Geological Age

THE State of Texas can claim one unusual distinction that is unrivaled by any other state: its oil production originates in rocks of every period on the standard geological time scale, from Cambrian through Quaternary inclusive.

This remarkable fact is a tribute to the petroleum industry. It is a unique fulfillment not consciously sought, but rather one that has come about through diligence on the part of exploration and production men since the first commercial oil field was discovered at Oil Spring, Nacogdoches County, in 1876.

How It Began

The first Texas oil came from Tertiary sand lenses at a depth of 60 ft.; today, at the other end of the geological column and on the opposite side of the state, the Cambrian at 6,000 ft. is providing flush oil wells, and the Ellenburger produces great quantities of gas at 15,000 ft. in Texas deepest field.

Early production discouraging . . . In 1897, J. S. Cullinan completed negotiations for eastern capital to erect the first refinery in Texas to process the oil discovered at Corsicana. He had visited the oil wells and had agreed with Corsicana officials to launch the refining venture. In Pittsburgh, Oil City, and Washington, he bought the necessary materials and shipped them to Corsicana.

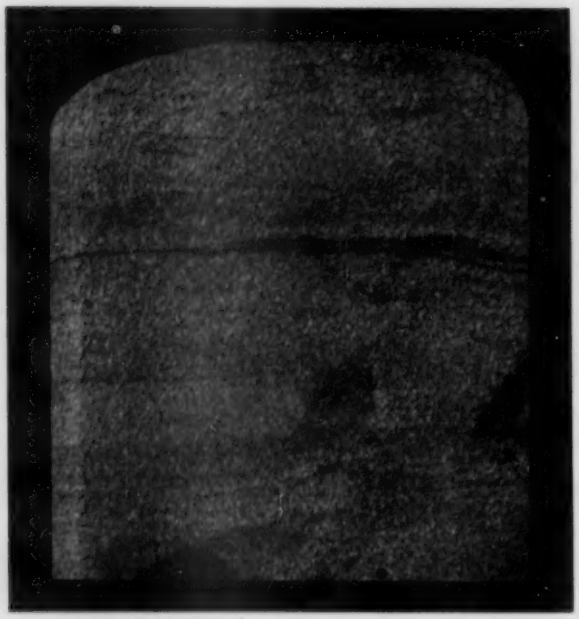
But meanwhile, the men who were financing him had examined scientific reports on the Texas prospect; their conclusions were negative. All hope was shattered when the reporting geologists flatly ruled out the possibility of oil in paying quantities for Texas. The financiers canceled their agreement with Cullinan.

Cullinan was not discouraged. In St. Louis, he found another source of capital, and the refinery became a reality under the name of J. S. Cullinan Co., the predecessor of the Magnolia Petroleum Co.

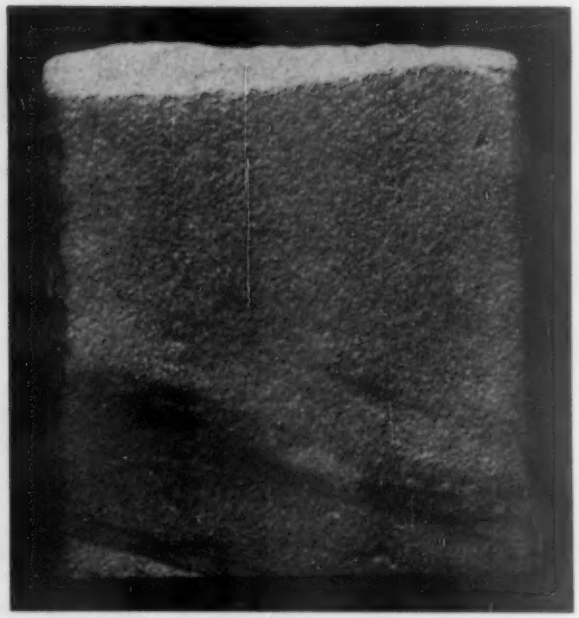
Development required experience . . . So the early geologists were wrong—so very wrong that the development of the oil industry in Texas might easily have been delayed indefinitely had it not been for the aggressive optimism of men like Cullinan. In fairness to these geological pioneers, however, it must be said that they had very little data to go on, no subsurface criteria, and indeed even today would be regarded as little more than witch doctors if they attempted predictions on evidence as shadowy as they possessed at the time.

Through 68 years of discovery, geologists and financiers have been learning, together, the peculiarities of oil occurrence—its oddities, its circumstances, and its monstrous inconsistencies. And the progress that follows learning and experience now has culminated in Texas' happy position at the head of the oil-producing column—a position roundly supported by flows of oil and gas from rocks of every age.

Pictures of cores from Texas' most famous producing formations start on next page →



1 COCKFIELD SAND has produced vast amounts of oil in the Texas Gulf Coast fields. This core, from Conroe field of Montgomery County, reveals the excellent porosity and granularity of the formation. Identifying characteristic of this sand in subsurface samples is presence of the foraminifer Nonionella cockfieldensis.



2 WOODBINE SAND of Upper Cretaceous age is the source of billions of barrels of oil in East Texas. This core from East Texas field shows the consistent sugary texture of the sand to good advantage. Porosity averages about 25 per cent, and permeability about 1,500 md. in East Texas field.

Texas Formations and Cores

Geologically . . . The mass of geologic data that has been accumulated over the years provides a wealth of material for further study and research by Texas geologists. Perhaps no state has been better documented throughout its phenomenal oil expansion than Texas, and the practice continues unabated, through the commendable efforts of a dozen major geological societies, the State Bureau of Economic Geology, the USGS, the Texas Petroleum Research Committee, and the Railroad Commission. In addition to the multitude of technical papers and publications on the geology and oil fields of the state, research centers at University of Texas have preserved core samples from deeper and important wells, fossil collections from every formation, and logs of thousands of tests.

Statistically . . . Crude-oil production in Texas during 1954 totaled 979,170,000 bbl. At its peak in 1952, the figure reached 1,099,792,599 bbl. This was achieved despite the necessity to seriously curtail output to keep the flow of oil within the best estimate of market demand.

As of January 1, 1955, there were 163,551 oil and gas wells on production in the state, producing a daily average of 3,261,117 bbl. of oil, and behind these wells lies a total proved crude reserve of 15,121,000,000 bbl. Total cumulative production for Texas (all years) now stands at 17,759,617,000 bbl.

Ultimately . . . Although present-day Texas fields produce from rocks of every period, a great deal of new oil and many new sources of oil lie ahead of the oil finder.

The emphasis today is on new sand discovery, lateral extension of known reservoirs, secondary-recovery operations, and new methods of recovering oil from unusual matrices (as the Spraberry).

There are some formations that are not yet oil productive; others are productive in one section of the state, but not in another; still others are producing minor amounts of oil, but should and will be much more prolific. In these rock categories lies the potential oil increase for future years in Texas.

THE PRODUCTIVE ROCKS

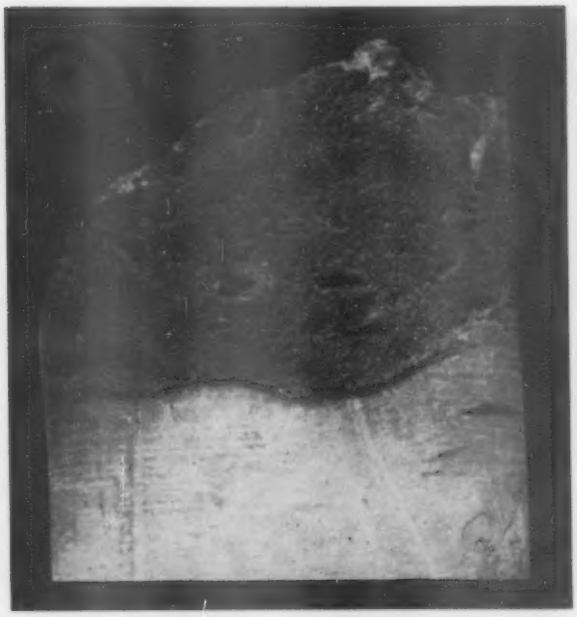
A brief examination of the principal producing formations in Texas reveals an extremely varied assortment of reservoir rocks. About 95 per cent of the oil comes from sedimentaries of post-Cryptonic age; a dozen or so fields produce from altered igneous rocks, others from conglomeratic granite wash, and some from semimetamorphosed anhydrite and cap rock on salt-dome structures. Variations in reservoir characteristics run the gamut from cavernous limestones to the tightest of sandstones; or as one geologist has expressed it, ". . . from capillary to cavernous."

Many volumes would be required to describe the lithology and mode of occurrence of Texas oil reservoirs, but a panoramic survey is appropriate and feasible.

Paleozoic

Cambrian . . . The newest rock system in Texas' oil-producing column is the oldest in geologic age. Oil from Cambrian beds was first discovered in Pecos County in 1942, but the production was economically not significant; early in 1953, however, Cambrian strikes in Coke and Nolan counties attracted nation-wide attention. To date production has been confined to the three counties cited above, but the trend is expected to move north and south into other counties of the Eastern Platform.

Conflicting views of various operators are encountered in attempting to fix the age of the Cambrian reservoirs; current opinion is that oil is flowing in some fields from the Hickory sand (earliest Cambrian), and in others from the Wilberns dolomite. The core photograph shows a recovery from the Wil-



3 EDWARDS LIMESTONE of Lower Cretaceous age has yielded prolific production in the fault-zone fields of Central Texas. It is a hard, gray limestone of varying porosity, and oil flows often are accompanied by large volumes of sulfur water. The Luling, Darst Creek, and Salt Flat fields are famous Edwards producers.

4 RODESSA MEMBER of the Glen Rose (Lower Cretaceous) formation forms deep oil, gas, and distillate fields in northeastern Texas. Here is a core from Tennessee Colony field of Anderson County, taken at a depth of 8,966-85 ft., showing the excellent porosity and unusual texture of the rock matrix.

berns, a fine-grained brownish-gray dolomite.

Cambrian wells have ranged from fair to prolific on the basis of initial potential tests, some discoveries reporting as much as 1,870 bbl. per day, and at least one operator has released recovery estimates of 1 million barrels per well. The oil is high-gravity, ranging from 42° to 52°.

Principal Cambrian producing fields to date are White Flat, North Dora, and EA in Nolan County, and Bronte field in Coke County. Average depth of production is 5,500-6,000 ft.

Cambro-Ordovician . . . A principal source of Texas oil has been the Ellenburger formation, since its discovery at Big Lake field (Reagan County) in 1929. As the Permian basin forged to the front of the country's oil activity, the deep Ellenburger fields of West Texas burgeoned all over the oil map until today the Ellenburger is one of the most widely distributed reservoir rocks in the state. It is interesting to note that in the 1930's only half a dozen counties had Ellenburger oil fields; today, 39 counties record Ellenburger production.

Accompanying is a photograph of a typical Ellenburger core. As a rule, the producing pay consists of light-colored dolomite and limestone, attaining a maximum thickness of some 1,300 ft. in Crane, Reagan, Upton, and Ward counties. Ellenburger oil varies in gravity from 32° to 43°, with a round average of 40°.

Some of the leading Ellenburger oil fields are Andector (Ector County), Big Lake (Reagan County), Keystone (Winkler County), and Embar and Martin in Andrews County. Producing depths vary from about 3,200 ft. in West Central Texas to a record 15,000 ft. in Pecos County, West Texas.

Ordovician . . . In recent years, many new oil fields have been discovered in rocks of Middle and Upper Ordovician age; in West Texas, these fields are located in Andrews, Crane, Ector, Pecos, and Winkler counties; and in North Texas, Middle and Upper Ordovician production has been established in Clay, Cooke, Grayson, and Montague counties.

The producing formations in these fields are the Simpson (McKee, Connell, and Waddell and Oil Creek sands) and the Montoya limestone. The Simpson presents an alternating section of green and black shales and sandstones, and the overlying Montoya is a cherty limestone with sandstone at its base.

The first Simpson oil was discovered in 1937 in the Sand Hills structure in Crane County at 5,875 ft. Its occurrence is erratic, and depth of production varies from 4,753 ft. in Girvin field (Pecos County) to 11,470 ft. in Block 31 Connell Northwest field (Crane County). Gravity of the oil averages 39° to 46°.

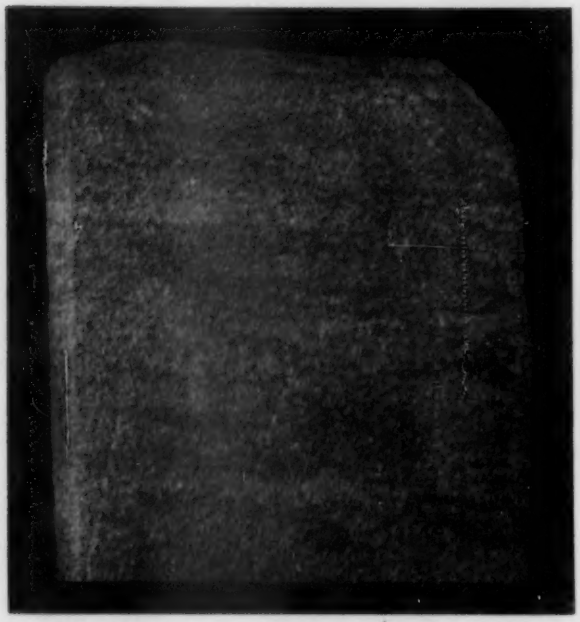
Principal fields producing Middle and Upper Ordovician oil are Abell (Pecos County), Block 31 and Sand Hills (Crane County), Jordan (Ector County), and Sandusky (Grayson County).

Silurian . . . Thirteen West Texas counties now have proved oil production from rocks of Silurian age, since the first Silurian discovery at Shipley field.

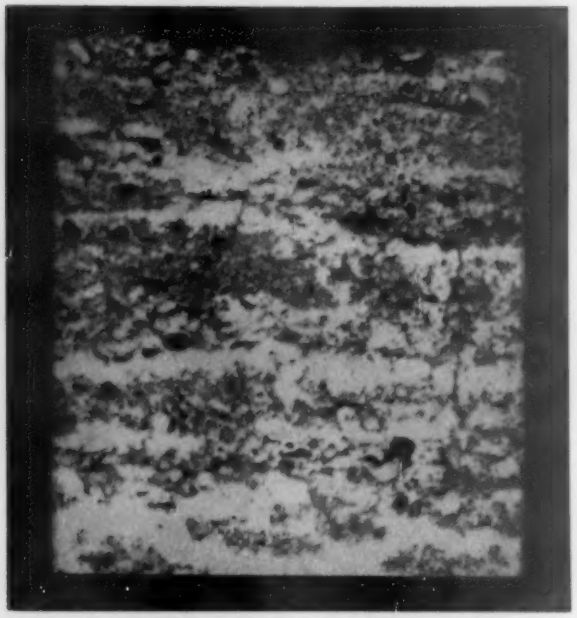
Silurian fields are more widespread than Upper and Middle Ordovician fields but the occurrence to date is confined to the Permian basin and production in barrels is less significant.

The greatest recoveries of Silurian oil have come from Dollarhide field (Andrews County), Keystone (Winkler County), and Abell field (Pecos County). Production in these fields is from limestone of Fusselman age (see core picture), found at depths of 4,936 ft. in Pecos County to 12,555 ft. in Sweetie Peck field of Midland County. Gravity of the oil is 35° to 43°.

Devonian . . . Good Devonian oil flows were first discovered at Crossett field in Crane County in August 1944. Development spread rapidly to the north, and there is a definite confinement of present-day Devonian fields to the tier of counties near the eastern border of New Mexico.



5 YATES SAND of upper Permian age has yielded some of the greatest oil flows ever recorded in history. This core, from Yates field, Pecos County, Texas, shows the fine-grained sand texture of the rock. Yates sand production has been found in fields throughout the Permian basin area of West Texas.



6 SAN ANDRES LIMESTONE is the production reservoir rock in a multitude of oil fields along the Central Basin Platform and in other parts of the Permian basin. This is a core from a depth of 4,533 ft. in Means field, Andrews County. It produces oil in at least 20 different West Texas counties.

Oil from the Devonian comes out of cherty limestone and true dolomites; recently, the trend of fields producing from these rocks has proved an important factor in development of significant fields in eastern Lea County, New Mexico.

Biggest recoveries of Devonian oil are recorded in Andrews County at Three Bar, Shafter Lake, Bedford, Dollarhide, and Fullerton fields; other great Devonian fields include TXL in Ector County, and Keystone in Winkler County.

Depths of flow vary from 5,207 ft. in Crane County to 12,592 ft. in Andrews County. Gravity range of Devonian oil is from 34° to 46°.

Mississippian . . . Most of Texas' Mississippian oil wells are concentrated in North and West Central Texas, but during the past few years, the production has been extended out into the Permian basin area.

The first recorded oil from the Mississippian was in 1940, when fields were discovered from the Chappel limestone in Archer, Clay, and Stephens counties. The Chappel, a light-colored limestone, is separated by a major unconformity from the overlying Barnett shale in this area, and in the years since the first discovery a great number of excellent Mississippian wells have been completed. (See core photograph of the Chappel limestone.)

Principal North Texas Mississippian fields are situated in Clay and Young counties, where the Ambassador, Burns, Joy, New York City, Knox, and Murray areas promise to contribute considerable barrelage. No really significant Mississippian discovery has been made in the West Texas region; the most productive to date is Garden City in Glasscock County. Other fairly good production has been found in Stephens and Eastland counties of West Central Texas.

Mississippian productive limestones are found at depths varying from 2,330 to 4,755 ft. in West Central Texas, 4,300 to 6,200 ft. in North Texas, and deeply buried at 8,070 to 12,100 ft. in the Permian basin. Gravity of the oil grades 40° to 44°.

Pennsylvanian . . . Extremely widespread are the oil fields producing from rocks of Pennsylvanian age in Texas. Some of the oldest and some of the newest areas produce from this prolific system, characterized by as many as 60 or 70 separate "pays."

The great Burkburnett and Ranger oil booms sprang from the first Pennsylvanian discoveries in the early 1900's; today, deep new Pennsylvanian deposits are being opened in the Panhandle and in the Permian basin. Oil has been found in sandstones, limestones, conglomerates, sandy shales, sandy limestones, reefs, and granite-wash conglomerates. Depths vary from as little as 80 ft. to 5,000 ft. in North and West Central Texas, from 1,400 to 11,350 ft. in West Texas, and 2,300 to 5,000 ft. in the Panhandle area. Gravity of oil ranges from 22° to as high as 50°.

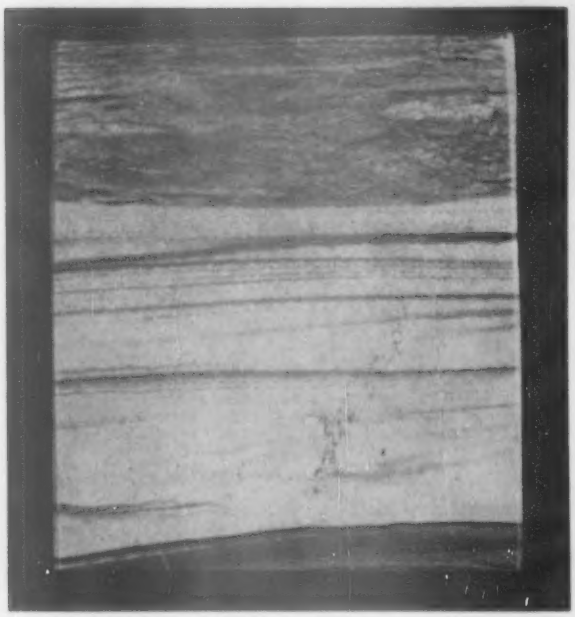
A detailed description of the multitude of Pennsylvanian producing formations is beyond the scope of this article, but all the principal members of the upper, middle, and lower Pennsylvanian series are oil productive.

Permian . . . The old Wichita County oil fields were among the first to register Permian oil production in 1910; but March 5, 1921, was the date most important in Permian oil history, for on that day the first oil well flowed from the Big lime and the basin that takes its name from these strata was opened to production.

Since that time, Permian beds have produced billions of barrels of oil in 56 counties stretching across a third of the State of Texas.

The Permian rocks present a varied stratigraphic sequence of thick black shales, anhydrite, dolomites, limestones, salt beds, potash, and red beds. Correlation and delineation of individual beds are made difficult by great changes in lithologic facies over relatively short distances, and geophysical surveys have encountered severe problems in recording, but through the years, as more

7 **CLEAR FORK ANHYDRITE core from Dollarhide field, Andrews County, is shown here. This formation, Middle Permian in age, was first found to be productive in the northern part of the Permian basin, but is now an important oil source in the middle and eastern portions as well.**



8 **SPRABERRY SANDSTONE of West Texas is pictured in this core from Reagan County, Texas. It is a tight, low-permeability sand reservoir, characterized by vertical fractures. Various experimental methods are now being tested in an effort to increase the recovery of oil from the Spraberry.**

data accumulated, geologists have succeeded in solving problems of oil occurrence, and the Permian basin has accounted for over one-quarter of Texas' total production.

Depth of Permian production is as variable as the lithology, Permian oil having been produced in Wichita County at 140 ft. and in Upton County at 10,000 ft.

Famous fields producing from the Permian are legion; nearly a dozen have flowed 100 million barrels or more. Of them all, perhaps the most famous is Yates field in Pecos County, site of the world's largest producing well—Ohio Oil Co. 30-A Yates flowed 204,681 bbl. per day in September 1929. Yates is the most prolific shallow field ever developed.

Mesozoic

Triassic . . . Triassic oil is believed to be more of a freak occurrence than an actual oil field; the only known production comes from shallow sands in the large Yates field in Pecos County. Some sources imply that the flow results from seepage up the holes of nearby tests into the sands, but others have contended that the production is entirely legitimate and logical in this area. Depth of the oil varies from as little as 30 ft. to a maximum 400 ft.

Jurassic . . . Only three Texas counties have given up oil or gas from rocks of Jurassic age. These are Bowie, Franklin, and Rains, in the northeastern corner of the state.

It may well be that important new fields remain to be discovered in the Jurassic deposits, but their extreme depth, difficulty and expense to produce, and generally disappointing production have all retarded commercialization.

Oil was first found in the Smackover limestone at 7,662 ft. in Texas at Eylau field (Bowie County) in August 1944. Since that time, three gas strikes have been made—one each in Bowie County (Flower Acres field), Franklin County (New Hope field), and Rains County (Ginger field).

In each case, the flow has come from dense limestone at depths of 7,072 ft., 12,096 ft., and 11,958 ft., respectively. Eylau is the only oil field, the other areas having produced gas and high-gravity distillate.

Lower Cretaceous (Comanche) . . . Oil operators first discovered oil in the Lower Cretaceous rocks in the early 1920's, and the opening of Luling and Darst Creek fields in Guadalupe and Caldwell counties marks an important epoch in the fault-line exploration and the development of deep (at the time) lime fields in Central, southwestern, and eastern Texas.

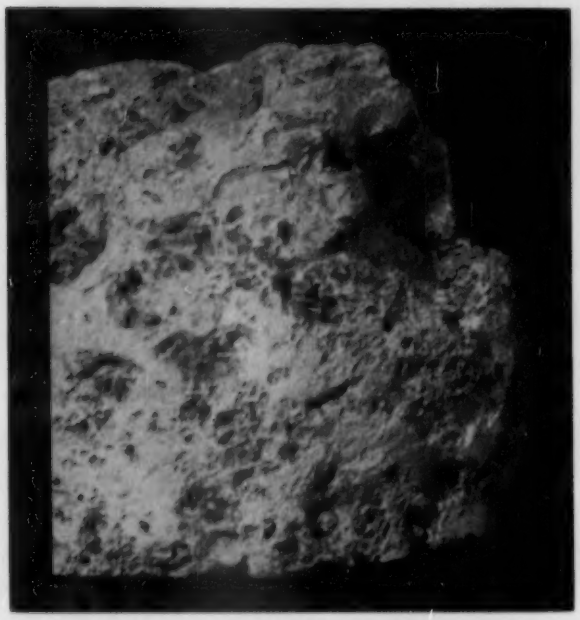
During the past 10 years, a remarkable geographic expansion of Lower Cretaceous production has occurred in northeastern Texas because of continued successes in the oldest or Trinity group of formations; large and prolific flows of gas and distillate have been contributed by wells completed in Travis Peak, Glen Rose, and Paluxy sands and limestones. Development of the shallower Comanchean group (Fredericksburg and Washita) has not progressed accordingly in southwestern and Central Texas; in the 1920's, however, some great oil wells were completed in the Edwards limestone.

Photographs of cores from the Glen Rose and Edwards are shown on these pages.

Producing depths in Lower Cretaceous fields vary from a shallow 27 ft. in Tom Green County to 10,160 ft. in Cherokee County. The oils produced display a wide range of gravity from 30° to 63° (both samples in Glen Rose).

Principal fields in Comanche strata are Chapel Hill (Smith County), Darst Creek and Luling (Guadalupe County), Rodessa (Marion County), New Hope (Franklin County), Talco (Titus County), and Salt Flat (Caldwell County).

Upper Cretaceous (Gulf) . . . The most famous oil reservoir in the world for the past 25 years has been the Woodbine sand of East Texas, once the largest oil field on earth and still one of the greatest after a quarter century of steady production.



9 **CANYON REEF LIMESTONES (Pennsylvanian) are pay formation for the famous Scurry County oil fields. This core photograph reveals the excellent porosity of the reservoir rock. Most of the reef fields lie on the Eastern Platform of the Permian basin and constitute the "horseshoe atoll" of that area.**

10 **STRAWN REEF LIMESTONES are important pay zones in the southern part of the Permian basin, especially in Coke and Tom Green counties, and excellent oil fields have been discovered. This is a picture of a core from the Strawn reef limestone in that area.**

Oil from the Woodbine had been discovered at Powell field (Navarro County) in January 1923 and the strike set off a fast drilling campaign over all eastern Texas in a search for similar reservoirs. Little hope was held for "deep East Texas," however, and when East Texas field was opened from Woodbine sand in 1930, no one was more surprised than the Texas geological fraternity.

Woodbine fields have not been found farther southwest than Leon and Anderson counties, but in the San Antonio district, excellent production has been found in the Navarro, Taylor, Austin, and Eagle Ford formations.

The majority of the Upper Cretaceous reservoirs are shaly sands of good porosity and permeability; as a rule, the porous sand beds are interlayered with shales and limestones. The Woodbine is about 70 per cent sand and 30 per cent sandy shale, and contains many shale breaks.

The Eagle Ford is, as a rule, a shale formation, but its upper member, the sub-Clarksville sand, has provided many good fields in Northeast Texas.

The Austin chalk is a brecciated chalky limestone which has produced oil in many areas, especially in the Balcones Fault region.

Sands of Navarro and Taylor age have proved to be good oil reservoirs throughout eastern Texas. It is of interest to note that Texas' first commercial oil field at Corsicana produced from Taylor sands at 1,000 ft.

Early discoveries in the Upper Cretaceous rocks were almost always associated with faulting, but large fields also lie on anticlines and domes, and stratigraphic traps are quite common.

Depth to pay varies throughout the Upper Cretaceous trend, from Navarro sand at 290 ft. in Marion County to Woodbine at 7,160 ft. in Leon County. Gravities range from a low 15° to 42°, with the average about 30°.

Cenozoic

Tertiary (Eocene) . . . Coastward from the Cretaceous producing areas lie the fruitful oil fields of the Texas Coastal Plain. It was in this area that the oil industry actually came into brilliant being in 1901 when the Spindletop salt dome gushed oil over the surrounding countryside. Since that time, some of the most famous oil fields in the world have been discovered between the Sabine River and the Rio Grande.

Oil is found here nearly 100 per cent in sands of Tertiary age at all depths, ranging from a few hundred feet to 8,000 ft.

Of the several stages within the Eocene, the Claiborne sands have produced the most prolific fields, closely followed by the Jackson and Wilcox sands.

The formations thicken as they are followed downdip from their outcrops, and change gradually from continental to marine facies.

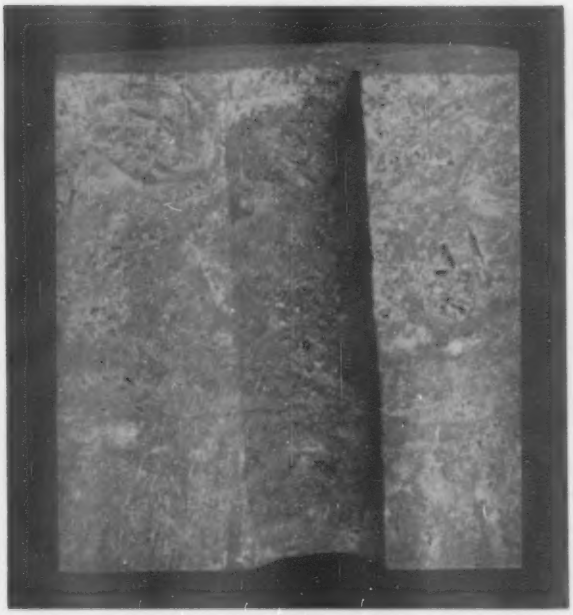
Structural traps are of every variety, but the dominant feature is the salt dome. About 52 of these mushroom-like intrusions are now productive of oil and gas, and many more remain to be proven.

Wilcox fields are confined to a position further inland than those of Claiborne and Jackson age. As a rule, they produce from anticlinal folds, often faulted. The Wilcox is a thick nonmarine sand section up to 5,000 ft. in thickness and is lost to the drill as it goes downdip toward the Gulf Coast. Prominent Wilcox fields include Englehart (Colorado County), Mercy (San Jacinto County), and Lake Creek (Montgomery County).

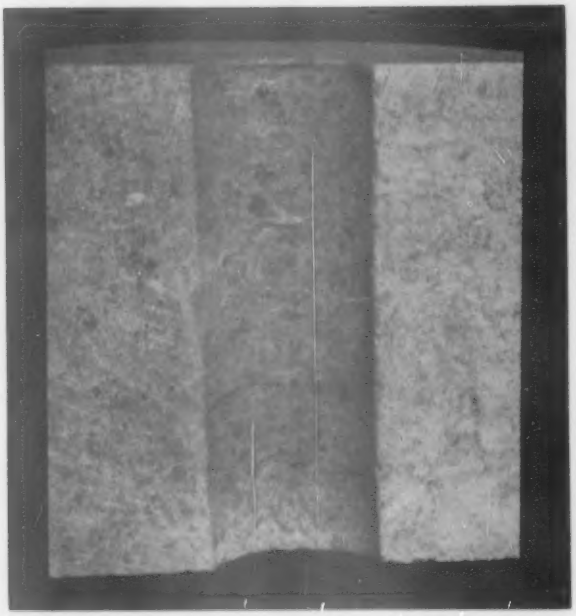
A photograph of a core from the Cockfield is included here; the Cockfield sand is one of the leading productive sand formations in the Gulf Coast. It is typical of the reservoir rocks encountered in drilling operations in the coastal area.

The most prominent Eocene-producing fields include Conroe (Montgomery County), Pettus (Bee County), Humble (Harris County), and Hull (Liberty County).

The Jackson sands reach their productive peak in the "shoreline trend" fields of Southwest Texas, in Zapata, Jim Hogg, Duval, and Webb counties; leading fields here are Government



11 **CADDO REEF LIMESTONES** produce in many oil fields in North and West Central Texas and are lower Pennsylvanian age. The reservoir rock is a hard, light-gray limestone of generally lower porosity than other reef limestones of the Pennsylvanian. Acidization and fracturing have been found to be most effective.



12 **CHAPPEL LIMESTONE** (Mississippian) is the reservoir rock in several oil fields in North Texas and recently in West Texas. Acidization is usually employed in completing these producers. There are relatively few oil fields now productive from rocks of this age, but more are to be expected.

Wells (Duval County), Henne-Winche-Farris (Jim Hogg County), and Mirando City (Webb County).

Tertiary (Oligocene-Miocene) . . . The greatest flows of oil in the coastal region of Texas have come from sands of the Oligocene and Miocene, here grouped as one because of the vague differentiation between the two on the subsurface.

As in the Eocene, beds are predominantly sands, interlayered with shales; some reef limes are encountered in the middle Oligocene section, and these have proved to be good oil reservoirs. Multiple sand fields are the rule, some having 30 or 40 separate "pays."

The great salt-dome fields produce their oil from cap rock and flank sands of Miocene and Oligocene age; other prolific fields occur over anticlinal uplifts and deeply buried domes.

Principal oil sands in the Oligocene section are those of the Frio, a great subsurface wedge, thickening enormously toward the coast. It is in this formation that the multiple sands of great oil fields like Seeligson (Jim Wells County), and Tom O'Connor (Refugio County) have been discovered.

Leading Miocene-sand fields are Greta and Refugio (Refugio County), and the famous cap rock salt domes like Spindletop, Barber's Hill, and Sour Lake.

TABLE 1—REPRESENTATIVE TEXAS FORMATION POROSITIES

County, field—Sand—	No. of cores	Range of porosities	Average porosity	Depth (ft.)
Chambers, Anahuac—Frio	22	23.4-37.1	30.4	6,960-7,078
Cooke, Walnut Bend—Middle Strawn	20	8.9-21.7	16.1	4,866-4,888
Franklin, New Hope—Bacon limestone	47	2.3-23.3	16.5	7,237-7,312
Franklin, New Hope—Elledge	25	3.1-10.4	6.5	8,245-8,266
Franklin, New Hope—Hill	34	9.5-20.7	15.4	7,352-7,375
Franklin, New Hope—Pittsburgh	152	1.7-20.6	11.3	7,960-8,049
Gregg, East Texas—Woodbine	8	23.8-30.1	27.3	3,514-3,523
Harris, Tomball—Yegua	8	15.8-25.9	20.3	5,419-5,573
Henderson, Opelika	3	17.6-22.6	19.8	8,250-8,354
Houston, Grapeland	16	17.2-25.6	21.5	5,881-5,979
Howard, Big Spring—Permian limestone	5	11.9-22.2	17.9	
Limestone, Mexia—Woodbine	100	5.1-29.7	18.6	2,910-3,025
Panola, Carthage—Lower Pettit	14	10.5-31.0	21.8	5,986-6,000
Scurry, Snyder—Canyon Reef	307	0-24.9	9.6	6,355-7,455
Wichita, K.M.A.—Strawn limestone	75	0.5-19.6	6.1	3,716-3,824
Willacy—Frio	1	14.9	14.9	9,144-9,150

Source: U. S. Bureau of Mines, R.I. 5025.

Quaternary . . . Minor quantities of oil are produced from sands of Recent age in Texas. At least two, Grassroots field and Toborg field (both in Pecos County), have reported regular production figures, but they are of no import from a production standpoint. Other isolated reports of Quaternary oil have come from Tom Green and Mitchell counties.

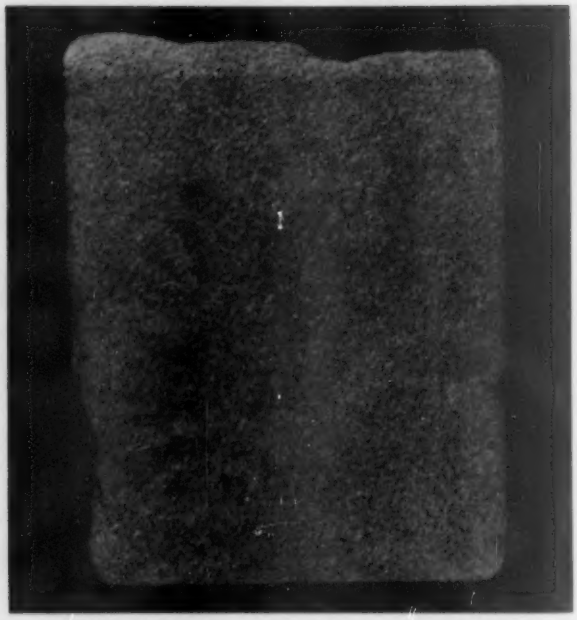
These freak occurrences are found in river sands and gravels, and it is likely that the oil has migrated upward or laterally from nearby producing fields, to be trapped in the coarse beds near surface.

Summary

From the complete sequence of strata here described, Texas has produced a grand total of 17,759,617,000 bbl. of oil between 1876 and 1955. History has carried the oil industry an infinite way from the days of 1543 when the De Soto expedition repaired its vessels with pitch at an asphalt deposit near Sabine Pass on the Texas coast.

Undoubtedly, the discovery of new oil deposits will continue for years to

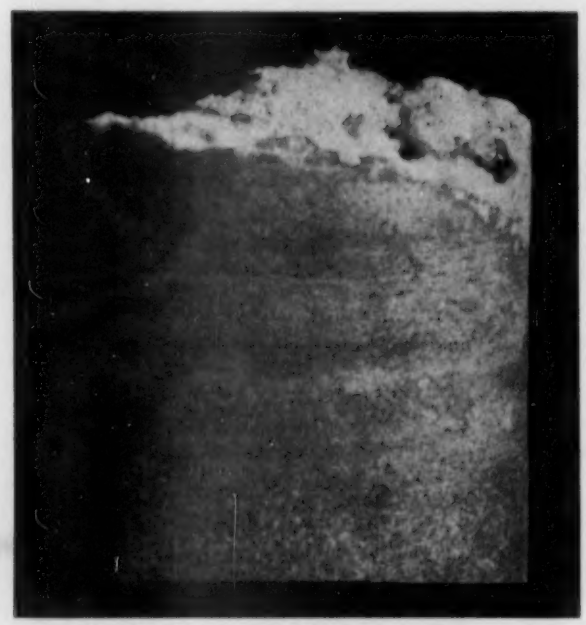
13 **FUSSELMAN LIMESTONE of Silurian age has produced oil in a fairly restricted area in the western portion of the Permian basin. Shown here is a core from this zone in Dawson County, Texas. First Silurian oil field was Shipley, Ward County, and production has spread slowly to the north and east.**



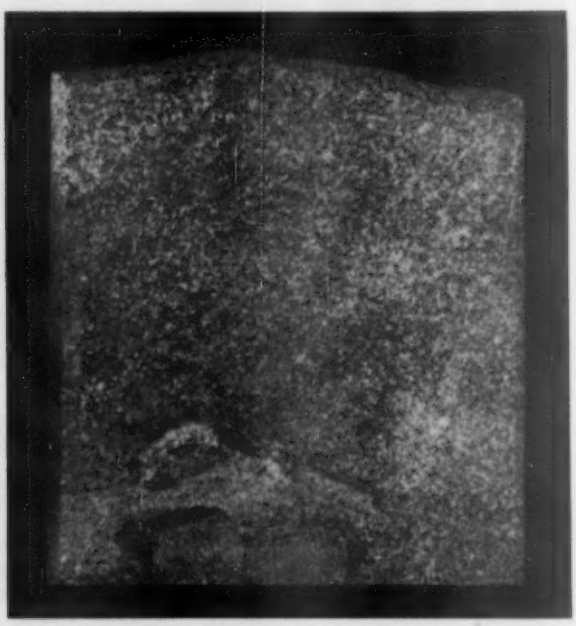
14 **SIMPSON SANDS are oil bearing in many fields in North Texas and in West Texas. The Simpson group is Middle and Upper Ordovician in age. This core, taken in the McKee sand (Simpson) is from Crane County, Texas, depth 8,154 ft. Photo displays the excellent porosity.**

come. The general impression is that "all the easy fields have been found," but people were saying that in 1949 before anyone had produced a barrel of oil from Scurry reefs. It is not that Scurry was "easy" to find, but it all depends upon one's interpretation of ease in oil finding—the dictionary gives "ease" as a synonym for "expertness."

Photographs of cores were supplied by Humble Oil & Refining Co., Houston; Core Laboratories, Inc., Dallas; Magnolia Petroleum Co., Dallas, and Chemical Process Co., Breckenridge, Tex.



15 **ELLENBURGER LIMESTONE is the principal source of pre-Permian oil in West Texas and is Lower Ordovician in age. It is perhaps the most widespread single source of oil in Texas, having produced over most of North Texas as well. This core shows the typical Ellenburger reservoir rock; it is from Pegasus field.**



16 **UPPER CAMBRIAN dolomite and sandstone are the most recently discovered reservoir rocks with production from seven fields in Coke and Nolan counties. The exact age of the producing formation is still a subject of controversy. This core is from a depth of 8,856 ft. in Schleicher County.**

Texas . . . Oil in Place—Primary Reserves and Secondary-Recovery Reserves

District	Area acres	Original oil in place (bbl.)*	Original primary reserves (bbl.)*	Oil production (1951), bbl.	Cumulative prod. (1-1-52), bbl.*	Primary reserves (1-1-52), bbl.*	Secondary reserves (1-1-52), bbl.*
1	53,515	1,366,496,893	422,806,966	12,008,618	305,740,791	118,996,269	119,268,976
2	115,910	2,488,110,066	1,547,008,929	59,815,267	663,105,245	895,523,454	50,255,103
3	224,065	10,366,279,705	5,910,489,734	169,726,652	2,895,091,728	3,018,138,250	248,336,000
4	286,199	4,414,610,862	1,677,835,905	94,142,476	1,105,265,325	606,265,355	455,977,104
5	34,853	1,549,014,000	879,974,730	16,592,804	539,423,498	341,136,132	61,289,000
6	247,417	10,086,167,800	6,260,251,725	141,309,658	3,250,622,388	3,012,531,246	658,547,252
7B	204,610	2,296,097,000	820,628,000	30,305,283	555,532,887	288,700,119	626,784,404
7C	72,670	2,353,877,000	594,254,456	31,465,757	298,284,987	303,696,541	207,519,400
8	936,810	47,493,764,000	9,131,813,908	345,944,271	3,054,959,527	6,127,634,765	6,456,446,279
9	360,295	7,133,261,000	1,748,459,379	59,729,194	1,202,752,680	556,983,229	1,413,778,600
10	160,780	4,852,317,000	1,118,341,000	30,951,745	726,126,907	392,234,182	242,300,000
	2,697,124	94,399,995,326	30,111,864,732	991,991,725	14,596,905,963	15,661,839,542	10,540,502,118

*At surface conditions.

Report on Texas Oil Resources

by Dr. G. H. Fancher*, with Prof. R. L. Whiting†, and J. H. Cretsinger‡

Cretaceous age strata . . . These have yielded oil in greatest amount in Texas. Some 4,075,484,231 bbl. of oil had come from these rocks in Districts 1, 3, 4, and 6. The supremacy of Cretaceous formations with respect to oil production in Texas is due primarily to one prolific formation, the Woodbine sand, which had produced over 3.5 billion barrels (January 1, 1952), slightly over 86 per cent of all Cretaceous oil and 1.6 billion barrels more than has been produced by the next most prolific formation (Frio). Cretaceous age reserves are about 4.3 billion barrels of which 77 per cent are primary reserves. However, 84 per cent of the Woodbine formation reserves are primary reserves.

The Edwards limestone has contributed about 5 per cent of the Cretaceous oil. Most of the Edwards oil has come from District 1 but District 3 also has produced a little. Oil from the Edwards limestone totaled 201,239,515 bbl. to January 1, 1952. Reserves in the Edwards formation are only about 62 million barrels, 83 per cent of which are primary reserves. Less than 1 per cent of the Cretaceous oil has come from the Navarro formation. Nevertheless, Navarro secondary reserves are over seven times as great as Edwards limestone secondary-recovery reserves.

Permian strata . . . Second largest producer of oil in Texas are the rocks and formations of Permian age which yield oil in Districts 7B, 7C, 8, 9, and 10. Permian-age reserves are greater than those of any other geologic formation in Texas, totaling about 8.9 billion barrels in Districts 7C and 8 alone about equally divided between primary and secondary reserves (48 and 52 per cent respectively) in addition to reserves of importance in Districts 7B, 9, and 10. The San Andres formation alone in Districts 7C and 8 has yielded a minimum of 1.5 billion barrels of oil despite the fact that some 5.2 billion barrels of reserves, about 54 per cent of which are primary, remain to be produced from the formation.

Oligocene age strata . . . These produce oil in Districts 2, 3, and 4, and have yielded 2,737,764,151 bbl. (January 1, 1952) and have about 3.9 billion barrels of reserves of which 76 per cent are primary and 24 per cent are secondary-recovery reserves. The Frio formation has contributed 71 per cent of all oil of Oligocene age. About 12.5 per cent of all Oligocene oil has come from the Marginulina which has equally substantial primary reserves but comparatively slight secondary-recovery reserves.

Eocene strata . . . These rank fourth in productivity. These strata yield oil in Districts 1, 2, 3, 4, and 6 and have contributed a total of 1,201,146,654 bbl. of oil (to January 1, 1952). About a third of the Eocene oil has come from the Jackson formation in which some 204 million barrels of primary reserve and 162 million barrels of secondary recovery reserve oil remain to be produced.

A "problem" formation is the Wilcox of Eocene age. The Wilcox has yielded only 84 million barrels of oil although it has some 120 million barrels of reserves and is one of the most widespread and consistent oil-bearing formations. Recovery in Wilcox fields generally is poor and costs of production are high.

Total Eocene reserves are nearly 1.2 billion barrels, 80 per cent of which are primary and only 20 per cent secondary recovery.

Pennsylvanian age strata . . . These yield oil in Districts 7B, 7C, 8, 9, and 10. These strata have produced as much and probably more oil than strata of Eocene age but the exact amount is not easily determined.

In all probability, Pennsylvanian strata in Texas have yielded a billion barrels of oil (to January 1, 1952).

Miocene-Pliocene age strata . . . These have contributed 680,819,865 bbl. of oil in Districts 2, 3, and 4. Miocene-Pliocene age reserves are comparatively low (251 million barrels, 91 per cent primary).

Ordovician age strata . . . These increasingly are important in West Central and West Texas (Districts 7C and 8). Some 275,134,066 bbl. of Ordovician age has been produced to (January 1, 1952). Known reserves are about 909 million barrels about 95 per cent of which are primary reserves. Nearly 95 per cent of all Ordovician oil has come from the Ellenburger formation.

Note—Oil in place and reserves, for tabulated data, are for surface conditions, January 1, 1952, reserves not divided by formations, for Districts 7B, 9, and 10.

Authors are with *Texas Petroleum Research Committee, †Texas A. & M. College, and ‡formerly with T.P.R.C. These oil-reserve tabulations for Texas are from the new report, "The Oil Resources of Texas," now available from the Texas Petroleum Research Committee and University of Texas, Austin.

Reserves by Geologic Formations for Districts 1, 2, 3, 4, 5, 6, 7c, and 8

DISTRICT 1: SOUTHWEST AND SOUTH CENTRAL TEXAS

Geologic age—Formation—	Original oil in place (bbl.)	Cumulative production (bbl.)	Primary reserves (bbl.)	Secondary reserves (bbl.)
EOCENE:				
Jackson	85,551,000	5,525,842	2,064,158	24,210,550
Yegua	38,357,000	4,480,000	4,588,087	1,001,880
Queen City	953,000	85,000	303,000	0
Reklaw	0	216	0	0
Carrizo				
Wilcox	67,361,000	6,062,561	28,922,439	555,000
Midway		180,630		
Total Eocene	192,222,000	16,334,249	35,877,684	25,767,430
CRETACEOUS:				
Navarro	447,641,000	31,931,085	25,447,664	70,846,371
Taylor	10,131,000	394,985	336,015	2,529,160
Austin	121,213,000	32,032,444	3,351,693	7,868,000
Serpentine	52,494,000	23,780,710	2,709,085	2,008,015
Buda	1,344,000	44,145	11,000	
Edwards	534,951,020	201,200,173	51,220,128	10,230,000
Total Cretaceous	1,167,774,020	289,383,542	82,075,585	93,481,546
ORDOVICIAN:				
Ellenburger	1,031,000	23,000	43,000	20,000
MISCELLANEOUS	5,469,873			
District total	1,366,496,893	305,740,791	118,996,269	119,268,976

DISTRICT 2: THE LOWER GULF COAST

MIOCENE	5,036,048	831,149	2,508,672	0
OLIGOCENE:				
Catahoula	79,719,115	22,298,902	19,693,084	1,517,000
Anahuac	655,827,180	120,605,254	208,354,493	19,456,252
Frio	1,426,053,164	401,469,791	608,974,717	9,490,151
Vicksburg	42,366,225	6,237,961	10,605,240	3,016,062
Total Oligocene	2,204,965,684	580,611,908	847,627,534	33,479,465
EOCENE:				
Jackson	12,339,190	2,064,414	280,891	1,682,172
Yegua	107,059,941	37,972,056	4,442,395	8,185,214
Cook Mountain	874,800	107,542	206,787	0
Reklaw	5,660,414	1,218,758	1,051,944	261,585
Wilcox	152,173,989	40,170,785	39,398,326	6,646,667
Total Eocene	278,108,334	81,533,555	45,380,343	16,775,638
MISCELLANEOUS		128,633	6,905	
District total	2,488,110,066	663,105,245	895,523,454	50,255,103

DISTRICT 3: THE UPPER GULF COAST

PLEISTOCENE:				
Lissie	45,000,000	26,367,376	1,232,624	0
PLEISTOCENE-PLIOCENE	39,000,000	19,008,922	4,991,078	0
PLIOCENE	184,856,666	100,670,401	18,152,293	1,600,000
PLIOCENE-MIOCENE:				
Lagarto	19,566,666	11,499,096	1,834,238	0
Pliocene-Miocene (Miscellaneous)	75,516,666	31,114,816	13,717,517	0
Oakville	16,148,334	8,392,906	1,823,761	800,000
Total Pliocene-Miocene	111,231,666	51,006,818	17,375,516	800,000
MIOCENE:				
Cap Rock	168,247,916	76,815,414	21,281,753	2,625,000
Other Miocene	957,360,768	437,465,816	168,238,560	14,004,818
Total Miocene	1,125,608,684	514,281,230	189,520,313	16,629,818
OLIGOCENE:				
Catahoula	10,023,333	5,866,487	950,179	0
Discorbis	5,000,000	1,835,116	1,193,581	0
Heterostegina	66,915,000	22,045,703	12,768,714	6,203,333
Marginulina	1,285,749,137	282,392,273	459,403,641	10,438,000
Marg-Frio	55,000,000	17,319,435	15,180,565	0
Anahuac	45,166,666	15,168,956	8,831,044	1,666,667
Frio	4,557,047,959	979,335,367	1,530,867,304	156,973,666
Vicksburg	166,753,334	56,532,448	27,856,369	18,166,667
Other Oligocene	228,120,751	86,907,581	48,982,578	966,667
Total Oligocene	6,419,776,180	1,467,403,366	2,106,033,975	194,415,000

DISTRICT 3: THE UPPER GULF COAST (Continued)

Geologic age—Formation—	Original oil in place (bbl.)	Cumulative production (bbl.)	Primary reserves (bbl.)	Secondary reserves (bbl.)
EOCENE:				
Cockfield	1,353,713,500	379,392,636	416,817,933	3,100,000
Jackson	189,209,583	83,642,985	37,137,060	5,085,000
Yegua	605,139,425	170,837,442	165,418,555	12,473,182
Cook Mountain	106,073,334	39,192,608	19,807,632	6,750,000
Sparta	11,800,000	2,528,957	2,221,043	0
Mount Selman	4,500,000	2,186,587	646,747	0
Reklaw	255,000	48,112	24,387	0
Wilcox	169,125,000	37,984,605	38,567,757	5,450,000
Other Eocene	660,667	252,655	80,679	0
Total Eocene	2,440,476,509	716,066,587	680,721,793	32,858,182
CRETACEOUS:				
Edwards	330,000	39,342	110,658	33,000
MISCELLANEOUS		247,686		2,000,000
District total	10,366,279,705	2,895,091,728	3,018,138,250	248,336,000

DISTRICT 4: SOUTH TEXAS

Geologic age—Formation—	Original oil in place (bbl.)	Cumulative production (bbl.)	Primary reserves (bbl.)	Secondary reserves (bbl.)
MIOCENE:				
Oakville	27,669,535	14,030,267	1,309,011	2,468,867
OLIGOCENE:				
Catahoula	117,436,041	38,128,895	20,657,605	4,805,807
Heterostegina	18,880,214	6,749,552	3,016,769	194,330
Marginulina	54,341,733	56,749,754	3,450,178	8,752,000
Frio	2,191,841,162	553,150,684	372,004,871	240,592,179
Vicksburg	142,610,559	34,969,992	25,910,111	31,415,693
Total Oligocene	2,525,109,709	689,748,877	425,039,534	285,760,009
EOCENE:				
Jackson:				
Whitsett	175,987,053	39,164,201	40,421,367	30,265,887
McElroy	1,136,775,049	231,762,020	100,939,566	84,214,599
Caddell	303,435,717	58,627,486	23,178,577	16,232,442
Total Jackson	1,616,197,819	329,553,707	164,539,510	130,712,928
Yegua	206,555,350	53,699,820	11,420,954	27,188,465
Cook Mountain	923,015	205,336	0	111,000
Queen City	120,000	24,593	0	0
Wilcox	232,740	24,304	45,518	0
Total Eocene	1,824,028,924	383,507,760	176,005,982	158,012,393
MISCELLANEOUS	37,802,694	17,978,421	3,910,828	9,735,835
District total	4,414,610,862	1,105,265,325	606,265,355	455,977,104

DISTRICT 5: EAST CENTRAL TEXAS

CRETACEOUS:				
Navarro:				
Nacatoch	3,028,540	342,014	1,077,742	752,854
Gibson	10,800,000	656,971	445,029	2,000,000
Total Navarro	13,828,540	998,985	1,552,771	2,752,854
Taylor	1,571,460	31,932	349,028	157,146
Eagle Ford	3,400,000	1,202,322	1,033,678	269,000
Woodbine	1,383,109,000	504,526,500	316,052,803	18,551,000
Washita:				
Buda	760,000	111,312	8,507	0
Georgetown		7,584		0
Total Washita	760,000	118,896	8,507	0
Walnut	4,000,000	136,117	13,883	100,000
Paluxy	55,193,000	20,525,113	11,368,887	6,123,000
Glen Rose:				
Upper Glen Rose	188,500	91,409	60,002	20,000
Bacon limestone	59,303,000	6,103,604	4,247,730	31,336,000
Lower Glen Rose:				
Hill, Gloyd, Young, etc.	22,193,500	5,017,613	6,194,602	1,980,000
Pettit (Pittsburg)	3,313,000	524,485	228,847	0
Total lower Glen Rose	25,506,500	5,542,098	6,423,449	1,980,000
Total Glen Rose	84,998,000	11,737,111	10,731,181	33,336,000
Travis Peak	2,154,000	145,744	55,394	0
Total Cretaceous	1,549,014,000	539,422,720	341,136,132	61,289,000
MISCELLANEOUS		778		
District total	1,549,014,000	539,423,498	341,136,132	61,289,000

DISTRICT 6: EAST TEXAS

Geologic age—Formation—	Original oil in place (bbl.)	Cumulative production (bbl.)	Primary reserves (bbl.)	Secondary reserves (bbl.)
EOCENE:				
Weches	2,500,000	435,126	0	0
Queen City	802,500	21,684	10,663	0
Reklaw	600,000	73,058	34,992	0
Carrizo	8,860,000	3,174,635	1,177,365	1,000,000
Wilcox				0
Total Eocene	12,762,500	3,704,503	1,223,020	1,000,000
CRETACEOUS:				
Navarro (Nacatoch)	21,550,834	3,320,515	879,286	1,000,000
Austin	10,004,166	1,030,941	509,654	0
Eagle Ford (Sub-Clarksville only)	167,464,326	11,597,825	28,821,065	18,645,660
Eagle Ford (remainder)	32,300,000	3,885,439	7,264,561	3,330,000
Woodbine	8,791,093,804	3,019,857,473	2,755,571,313	569,952,340
Fredericksburg (Goodland)	775,000	85,969	112,384	0
Paluxy	666,086,700	164,651,395	129,863,966	28,021,845
Glen Rose (upper)	25,620,354	3,042,008	2,499,243	3,438,770
Glen Rose (lower Rodessa)	208,523,079	19,169,839	51,327,729	11,082,708
Glen Rose (lower Pettit)	98,864,174	15,513,054	18,569,844	16,320,178
Travis Peak	49,122,863	4,484,169	15,568,105	5,355,751
Total Cretaceous	10,071,405,300	3,246,638,627	3,010,987,150	657,147,252
JURASSIC (Smackover limestone)	2,000,000	278,924	321,076	0
MISCELLANEOUS		334		400,000
District total	10,086,167,800	3,250,622,388	3,012,531,246	658,547,252

DISTRICT 7-C: WEST CENTRAL TEXAS

PERMIAN:				
Guadalupe (Tansill, Yates, Seven Rivers, Queen)	476,520,000	43,156,200	32,834,800	24,476,000
Guadalupe (Grayburg)	522,850,000	88,977,640	40,555,981	76,670,000
San Andres	101,750,000	25,649,361	8,106,777	6,950,000
Glorieta	800,000	180,454	19,546	100,000
Clear Fork	63,000,000	22,302,716	2,716,280	3,000,000
Clear Fork-Wichita (Spraberry)	11,250,000	1,679,596	941,777	0
Wolfcamp	27,050,000	1,274,434	5,571,240	0
Miscellaneous Permian	7,500,000	1,459,665	1,577,605	0
Total Permian	1,210,675,000	184,680,066	92,324,006	111,196,000
PENNSYLVANIAN:				
Cisco	10,437,000	879,273	919,074	0
Canyon	61,486,125	4,994,416	9,320,046	6,822,200
Strawn	503,337,875	27,945,774	99,215,410	58,311,200
Bend	13,078,333	423,765	1,070,378	0
Miscellaneous Pennsylvanian	64,865,000	22,778,180	2,894,612	3,190,000
Total Pennsylvanian	653,204,333	57,021,408	113,419,520	68,323,400
DEVONIAN		46,711		
SILURIAN—MIDDLE (FUSSELMAN)	11,261,000	362,787	944,543	0
ORDOVICIAN—LOWER (ELLENBURGER)	478,498,333	56,124,339	96,997,151	28,000,000
MISCELLANEOUS	238,334	49,676	11,321	0
District total	2,353,877,000	298,284,987	303,696,541	207,519,400

DISTRICT 8: WEST TEXAS

PERMIAN:				
Ochoa	10,840,000	452,520	1,338,976	1,608,000
Whitehorse	7,398,905,000	920,603,554	533,102,617	1,352,118,279
San Andres	22,773,471,000	1,429,385,045	2,815,882,873	2,385,125,000
Clearfork	6,899,884,000	224,178,124	723,698,075	745,980,000
Wichita	120,760,000	4,340,138	10,539,796	14,000,000
Wichita—Clearfork (Spraberry)	316,200,000	8,978,668	69,347,459	0
Wolfcamp	54,543,000	3,586,394	5,132,709	4,305,000
Total Permian	37,574,603,000	2,591,524,443	4,159,042,505	4,504,136,279
PENNSYLVANIAN:				
Cisco	28,894,000	7,213,095	2,521,678	6,376,000
Canyon	5,275,986,000	99,292,282	605,514,686	1,639,134,000
Strawn	43,064,000	4,289,664	11,258,589	4,120,000
Bend		34,587		
Total Pennsylvanian	5,347,944,000	110,829,628	619,294,953	1,649,630,000
MISSISSIPPIAN	990,000	158,963	84,533	0
DEVONIAN	2,127,850,000	97,450,000	494,915,405	258,000,000
SILURIAN	261,555,000	14,952,123	63,650,657	10,500,000
ORDOVICIAN:				
Miscellaneous	88,827,000	11,214,008	17,191,727	5,680,000
Ellenburger	1,966,770,000	207,772,719	761,204,565	0
Total Ordovician	2,055,597,000	218,986,727	778,396,292	5,680,000
MISCELLANEOUS	125,225,000	21,057,638	12,250,420	28,500,000
District total	47,493,764,000	3,054,959,527	6,127,634,765	6,456,446,279

SLOW DRILLING RATES with mud made use of exhaust gas as a drilling fluid look attractive. Here are the rig and equipment used on the test. Fig. 1.

In Arkansas' hard rocks

Exhaust Gas Boosts Drilling Rate

by Charles B. Erbe

Because natural gas was not available and use of air seemed too hazardous, Carter Oil Co. used engine-exhaust gas as a drilling fluid in this Arkansas well. These conclusions were reached:

- Bit life increases and penetration rates rise as compared to mud drilling.
- The volume of exhaust gas from the rig and compressor engines is adequate for most drilling, but the gas must be treated to prevent excessive corrosion when used continuously.
- As in any vapor-phase drilling, the hole must be dry for successful operation.

USING engine exhaust gas as a drilling fluid—a unique application to rotary drilling—has been done successfully by Carter Oil Co. at Carter et al 1 J. H. Jones. The well is a recent wildcat in Conway County, Arkansas. Three intervals, a total of 1,862 ft., were drilled with this exhaust gas and results were good.

Carter hit upon the use of engine exhaust gas as a drilling fluid while looking for the most effective way to penetrate the locality's hard, well-compacted formations. The use of mud was bypassed because it produced only slow penetration at two previous Carter wildcats in similar hard Arkansas formations. Another operator in the same area had drilled faster with air, but that was passed over because not enough was known about down-the-hole hazards when using air. And natural gas was out because it wasn't economically available at the Jones well site.

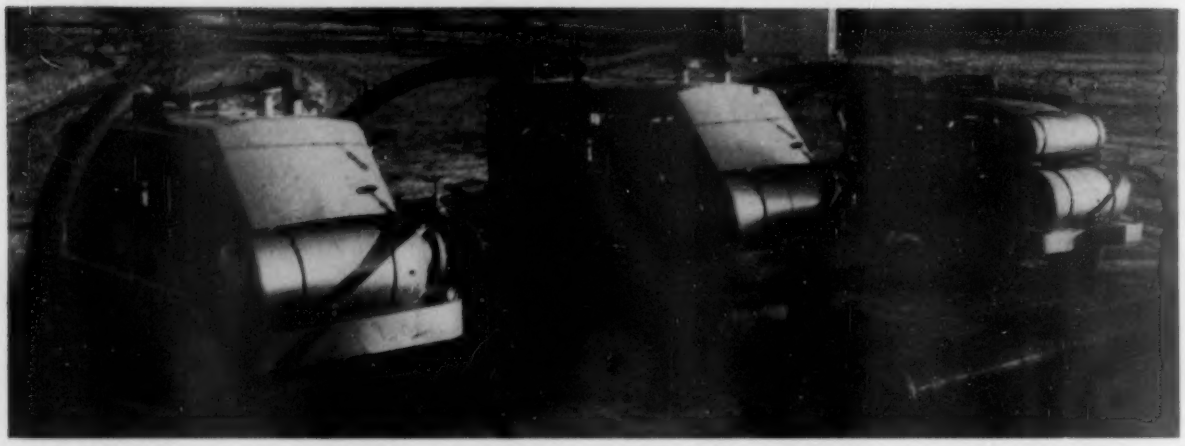
Engine exhaust gas, on the other hand, seemed to fill the bill. It was readily available from rig and compressor engines and it has a relatively low oxygen content. Its big disadvantage, corrosiveness, posed a problem. But Carter engineers figured they could solve it through reduction of water content and use of inhibitors in the processing stages.

Processing equipment . . . Equipment was designed and installed by Carter at the 1 Jones for cooling, separating liquids, compressing, and measuring exhaust vapors as shown by Fig. 2. Major items included two atmospheric coolers, two heat exchangers, two separators, and three portable compressors. The drilling rig was equipped with two 325-hp. gas-fueled engines. The over-all installation is shown in Fig. 1.

The system used as much exhaust gas as possible from the two natural-gas-fueled rig engines. The remaining exhaust vapors were supplied by diesel-fueled compressor engines, and supplemental make-up air was added as required.

Exhaust gas was processed through

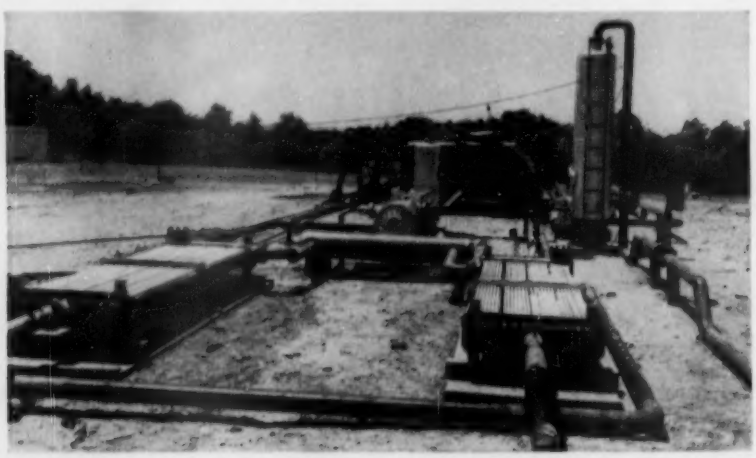
Author is with Carter Oil Co., Purcell, Okla.



THESE COMPRESSORS brought the exhaust gas up to the pressure needed for drilling. The exhaust from the engines on these compressors and the drilling engines was more than enough. Fig. 4.

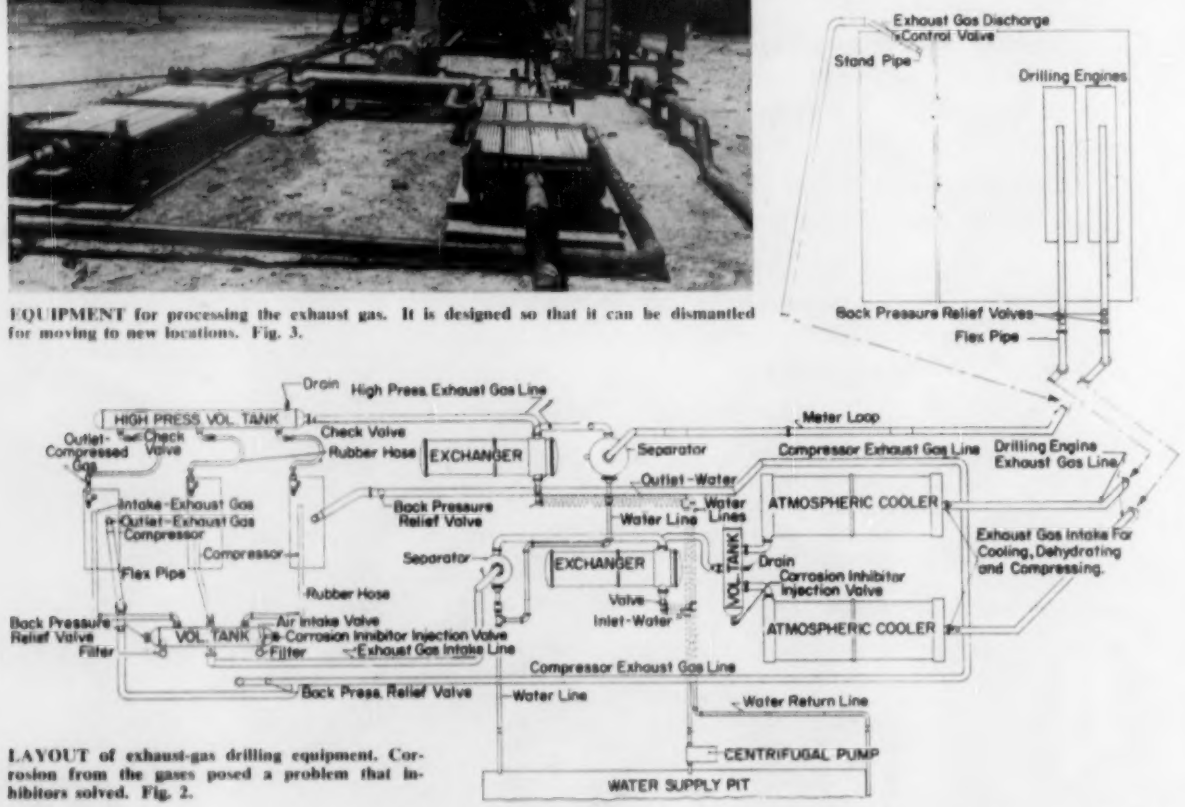
the equipment shown in Fig. 3, and metered prior to going to the standpipe on the rig floor. Cooling water for the unit was taken from a nearby pond. The processing equipment was designed so that all of it could be dismantled and moved to a new drilling location, or portions of it could be salvaged for use in conventional oil-field operations.

Compressor facilities consisted of two 600-cu. ft. per minue and one 315-cu. ft. per minute portable rotary compressors (Fig. 4). They had a combined capacity of 1,515 standard cu. ft. per minute at 100 psig. These compressors were powered by two 90-hp. and one 45-hp. direct-connected diesel engines. Fuel consumption was approximately 508 gal. per day. The compressors were rented because of the short time they'd be used.



EQUIPMENT for processing the exhaust gas. It is designed so that it can be dismantled for moving to new locations. Fig. 3.

Exhaust flow line . . . Exhaust vapors, dust, and cuttings were conducted away from the rig through 240 ft. of 7-in. o.d. flow line (Fig. 2). Sample cuttings were taken from a catcher on this line. The end of the flow line was equipped with



LAYOUT of exhaust-gas drilling equipment. Corrosion from the gases posed a problem that inhibitors solved. Fig. 2.

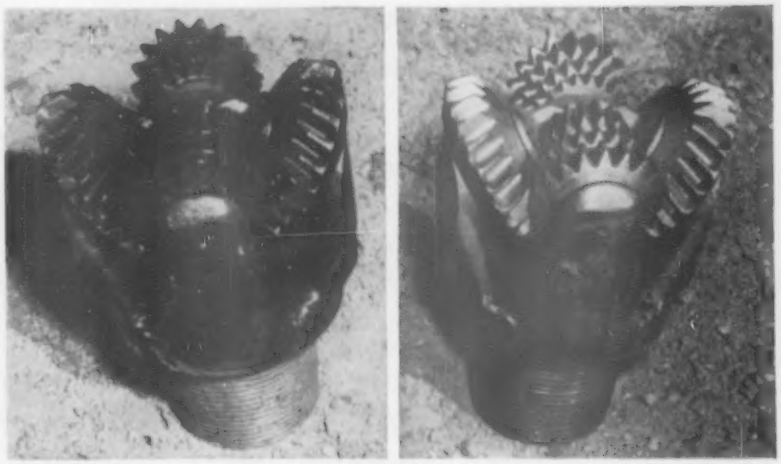
a spray, but this proved unsatisfactory because dust discharged while cleaning the hole plugged the water ports. A flare (Fig. 5) was provided so that any gas produced would be ignited.

Well-head equipment . . . Slight modification of conventional rotary well-head equipment, as shown in Fig. 6, provided adequate control for vapor drilling. A conventional double-gate-type mechanically operated blowout preventer was used, together with a rotating stripper head for sealing off around the kelly.

Drilling technique . . . Vapor circulation was controlled by the standpipe valve on the rig floor. Closing this valve stopped circulation and the compressors automatically unloaded within seconds. Connections were made by stripping the kelly and a drill-pipe single through the rotating stripper head in place. When making round trips, the stripper head was set back with the kelly. It was necessary to circulate near bottom for approximately 15 minutes before starting a round trip to clean the hole. Even so, there was a fill-up of several feet of cuttings after each shutdown. But the cuttings became quite fluid when circulating was resumed and it was possible to return to bottom without rotation.

Several drilling conditions were accurately and quickly indicated by the exhaust gas. Returns were seen within seconds after circulation was begun. Dust in the exhaust indicated that cuttings were being lifted, and an abrupt stoppage of cuttings or dust indicated moisture in the hole or a plugged bit.

Exhaust-gas operation . . . Application of exhaust-gas drilling on the 1 Jones was limited by various circumstances to three intervals: 421 to 506 ft.; 3,344 to 3,592 ft.; and 3,609 to 5,138 ft., a total of 1,862 ft. In each case, drilling was increased over that of mud for the interval above, and the last interval was penentrated at a rate of 11.49 ft. per hour. Based on this penetration rate, the increase in drilling rate, as compared with a mud-drilled well in the same interval, was 475 per cent greater.



THE BIT on the right has drilled 723 ft. The one on the left is new. Bit footage while drilling with exhaust gas was more than 10 times better than with mud. Fig. 7.

Another important characteristic of exhaust-gas drilling observed was the increased bit life. In each of the above cases, bit performance was improved.

An unusual single-bit run of 723 ft. was achieved while drilling with vapors. Comparison between this bit and a new bit is shown in Fig. 7. The improved bit life was 1,325 per cent greater than that obtained from a comparable well of the same interval drilled with mud.

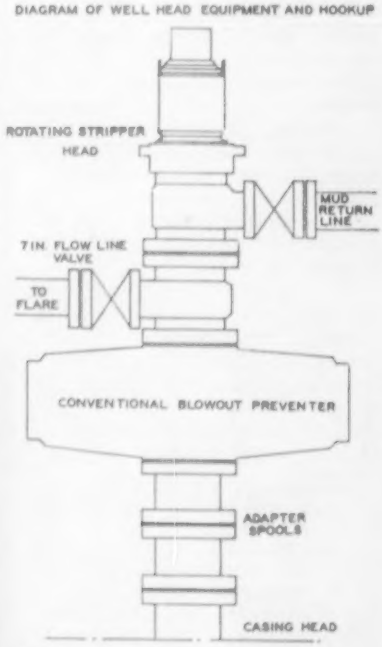
Two factors contributed much to these increased penetration rates and the longer bit life: (1) faster removal of cuttings from under the bit; and (2) less rock compaction due to the difference in hydrostatic head of mud as compared to the weight exerted on the formation by a column of gas.

Performance of the exhaust-gas system was generally satisfactory. The gas volumes were sufficient, averaging 2.5 M.M.c.f.d., and the capacity of the processing equipment was adequate. In addition to the gas being cooled from 950° to 90° and being compressed from 0 psig. to 60 psig. the gas was passed through a separator.

Corrosion, one of the principal problems, became apparent in the system although some success was obtained using corrosion inhibitor. Test coupons indicated a corrosion rate of 11 mg. per sq. dm. per day in the low-pressure side, and 70 mg. per day in the high-pressure side of the system. But injecting the inhibitor in the high-pressure side too should alleviate this condition.

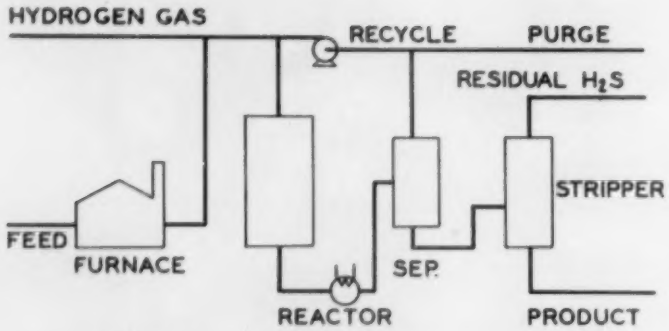
A FLARE was kept at the end of the flow line to burn any gases that might come from formations being drilled. Fig. 5.

DIAGRAM OF WELL HEAD EQUIPMENT AND HOOKUP



THIS WELL-HEAD setup gave good control for vapor drilling. The stripper head was well lubricated to prevent leakage of gas. Fig. 6.

No. 4 in a Series on Hydrofining



FLOW PLAN of naphtha Hydrofining. Fig. 1.

Hydrofining Is a Natural for Naphthas

by Donald L. Baeder and Charles W. Siegmund

A Versatile Process

THE Hydrofining process, developed by Standard Oil Development Co., offers the refiner an extremely versatile process for product quality improvement.[1] Many types of petroleum stocks can be markedly upgraded by Hydrofining. This versatility stems, largely, from the broad experience Standard Oil Co. (New Jersey) has gained in the field of hydrogenation. Economically speaking, Hydrofining is in general an attractive process even if the needed hydrogen is manufactured by conventional steam reforming. It becomes especially attractive when by-product hydrogen is available from catalytic reforming.

This paper deals specifically with the application of Hydrofining to naphthas. Hydrofining of lube oils[2] and middle distillates[3] was discussed in recent articles while Hydrofining of gas oils to improve catalytic cracking characteristics will be treated in an article to follow.

1. Hydrofining's Use in Product Improvement, The Oil and Gas Journal, October 18, 1954.

2. Lube Hydrofining, W. A. Jones, The Oil and Gas Journal, November 1, 1954.

3. Hydrofining of Middle Distillates, R. C. Morbeck, The Oil and Gas Journal, January 3, 1955.

HYDROFINING offers many advantages over conventional methods as a final treating step for naphthas. Some of the more important are:

1. Major product quality improvements in desulfurization, gum formation, stability, engine cleanliness, odor, and color.

2. Upgrading of poor-quality stocks previously considered unattractive for processing.

3. Finished product yields of 100 per cent.

4. No rerunning of finished product; required of certain treating processes.

5. No disposal problem of waste products from treating process. The main byproduct (H_2S) of Hydrofining is readily converted to sulfur.

6. Continuous operation with relatively simple equipment.

In addition to these advantages, Hydrofining's versatility offers the refiner an extremely flexible process. It allows blocked operation between widely different feed stocks such as naphtha and diesel oil. Most important, it assures constant product quality independent of crude source.

Process Description

Naphtha Hydrofining is for the most part a mild catalytic hydrogenation process in which treating severity is controlled by a proper choice of conditions and catalyst. The reaction is carried out in a fixed-bed reactor. The hydrogen-to-oil feed ratio is maintained at an economic minimum by balancing gas-compression costs against severity and catalyst life.

In general, a feed preheat furnace is required. However, in certain cases where the operation is mild enough to warrant it, feed preheat is supplied by exchange. Hydrogen consumptions depend on the severity of the operation and the feed stock treated and may be as low as 5 standard cubic feet per barrel.

Hydrofining requires no specific hydrogen purity; successful operations have been demonstrated with gases containing as low as 30 per cent hydrogen. The finished product from the Hydrofiner receives no special handling other than caustic washing or stripping to remove dissolved H_2S produced in the process.

Fig. 1 shows a simplified flow diagram of a naphtha Hydrofining unit.

Variables . . . The variables and range generally encountered in naphtha Hydrofining are shown in Fig. 1. Since naphtha Hydrofining is a selective operation, a careful choice of variables (including the catalyst) is necessary.

Hydrofining is an extremely mild operation. High feed rates used reduce reactor and catalyst costs. Fig. 2 shows the effect of feed rate on sulfur and olefin conversion for a mixed sour thermal naphtha. Feed rates as high as 10 volumes per hour per volume give 60 per cent desulfurization and excellent reduction in General Motors gum. High feed rates are desirable for best

desulfurization with least olefin saturation.

Temperature, pressure, and choice of catalyst are also important. Fig. 3 shows the effect of pressure on desulfurization and olefin saturation for a coker naphtha. Lower pressures are generally more desirable. However, since lower pressures increase the catalyst deactivation rate, choice of pressure requires a careful balance between desired quality improvements and catalyst life.

Selection of a catalyst is also important in obtaining a high selectivity to desulfurization. Fig. 4 shows the effect of catalyst choice on desulfurization and olefin saturation for a heavy catalytic naphtha. While both catalysts are acceptable for desulfurization, catalyst B is more selective. It gives less olefin saturation for a given degree of desulfurization, thus minimizing octane loss.

This emphasizes need for a careful choice of operating conditions and catalyst. Effects of feed rate, pressure, and catalyst show the same trend for other stocks, but vary in magnitude depending on the feed stock to be treated.

Hydrofining of Virgin Naphthas

Light virgin naphthas may be Hydrofined for sweetening and desulfurization under extremely mild conditions. Even under these conditions, as much as 90 per cent of the sulfur is removed. This sweetening and sulfur reduction result in an improved lead susceptibility which gives a big improvement in leaded research and motor octane numbers. The degree of this leaded octane gain depends on the sulfur content of the total gasoline pool. Typical results for Hydrofined virgin naphthas are shown in Table 1.

Primary advantage of Hydrofining over other sweetening processes is greater sulfur removal. Sulfur compounds other than mercaptans are easily removed thus reducing sulfur content of the final gasoline pool. Hydrogen consumption is extremely low and catalyst life greater than 1 year.

Hydrofining provides an excellent process for feed-stock preparation in nonregenerative platinum catalytic reforming. For this specific application, more severe but still relatively mild conditions are used. This results in product sulfurs of 1 to 10 p.p.m. Yields are 100 volume per cent and catalyst life in excess of 6 months without regeneration. Low sulfur reformer feeds give improved yields and greatly extend the life of the platinum catalyst.

Hydrofining of Cracked Naphthas

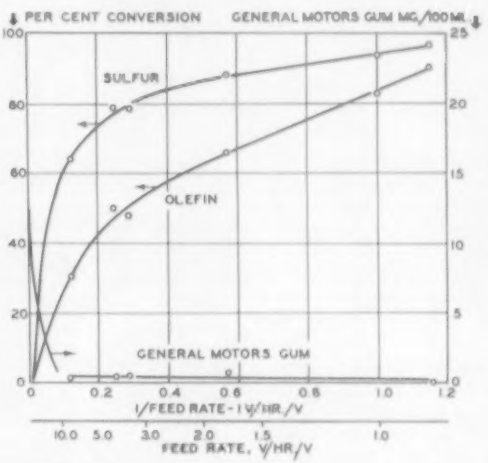
This application of Hydrofining is designed to reduce high sulfur content, improve storage stability, prevent formation of gummy deposits, and correct those properties which tend to foul engines. The operation requires careful choice of conditions and catalyst to regulate severity. Product improvement must be balanced against minimum olefin saturation which, if excessive, will reduce octane number resulting in a debit for the process.

Existing processes designed to give these improvements generally involve treatment of products with strong acids, followed by necessary redistillation. Table 2 compares the treating results obtained by Hydrofining and acid treating of both heavy thermal and catalytic naphthas.

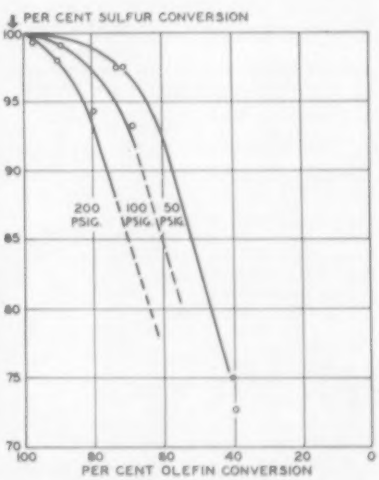
Hydrofining shows a higher yield of treated product, greater desulfurization, improved product stability, and engine cleanliness. Leaded octane numbers of the products are comparable with lit-

TABLE 1—HYDROFINING VIRGIN NAPHTHAS

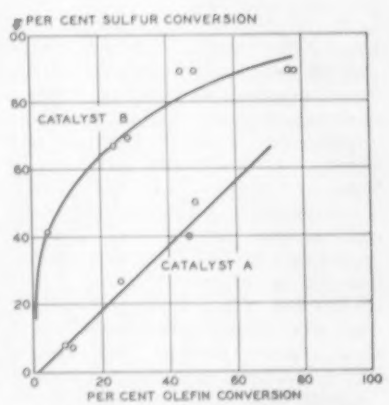
	West Texas (200°/320° F.)		Iranian (170°/330° F.)		Iran (216°/300° F.)	
	Feed	Product	Feed	Product	Feed	Product
Sulfur, weight per cent	0.12	0.01	0.10	0.004	0.06	0.006
Mercaptan number	33	0	18.3	0	1.4	0
Odor	....	Good	....	....	....	....
Doctor test	....	Pass	....	....	....	....
C.F.R.R. octane number:						
Clear	63.5	64	48	50	40	45
+ 2 ml. TEL	75	80.5	64	70	59	65
C.F.R.M. octane number:						
Clear	....	....	51	51	43	46
+ 2 ml. TEL	....	....	63	72	61	68
Yield, volume per cent	....	100	....	100	....	100



HYDROFINING a thermal naphtha from mixed sour crude (300°-450° F.). Fig. 2.



HYDROFINING C_5 to 430° F. coker naphtha. Fig. 3.



CATALYST COMPARISON when Hydrofining a heavy catalytic naphtha blend. Fig. 4.

THE AUTHORS

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tle or no loss over feed octane number.

Where sulfur content of the total motor-gasoline pool is a problem, Hydrofining of light catalytic naphtha may be used to bring about sharp sulfur reduction. Since this fraction is often a large part of the total pool, its composition will greatly affect the total composition. Therefore, it is extremely important to choose conditions which minimize loss in research octane number.

Table 3 shows the results of desulfurizing a 200°/350° F. e.p. catalytic naphtha to a very low sulfur level. In this case, for 90 per cent desulfurization there is a loss of 1 research octane number, but less severe operation would give correspondingly less octane loss.

Hydrofining Tractor Fuel

Hydrofining has been applied to upgrading tractor fuel, which is a blend of heavy catalytic naphtha, light catalytic heating oil, plus some virgin components. The virgin components do not normally require Hydrofining. Purpose of the operation is sulfur reduction and improvement in color and oxidation stability. Typical results are shown in Table 4.

Operations under conditions of medium severity on this stock give approximately 90 per cent sulfur reduction and marked improvement in preformed and potential gum. Motor octane loss under these conditions is about 2 octane numbers clear. Tractor fuel is normally sold as a clear fuel.

Under these conditions catalyst life is about 12 months without regeneration.

TABLE 2—HYDROFINING VS. ACID TREATING OF CRACKED NAPHTHAS

Source—	Heavy cat. naphtha			Hvy. thermal naphtha		
Boiling range—	250°/442° F. e.p.			300°/450° F. e.p.		
	Feed	Hydro-fining	Acid* treat-ing	Feed	Hydro-fining	Acid* treat-ing
Sulfur, weight per cent	0.24	0.07	0.21	0.28	0.12	0.17
Bromine number	23	17	19	34	24	31
General Motor gum†	3	.5/2.4	3	12	.5/1.0	2
A.S.T.M. breakdown—min.	465	1,440+	790	70	1,440	250
FL-2 rating, per cent of reference‡	96	77	66	107	56	50
C.F.R.R. octane:						
Clear	92.5	90.5	91.5	59.5	52.5	59.5
+ 2.0 ml. TEL	96.0	95.5	95.0	70.0	69.0	70.0
Yield—volume per cent		100	§98		100	§97

*Four pounds per barrel of 76 per cent acid. †Inhibited with 2 lb. per 5,000 gal. of phenylene-diamine type inhibitor. ‡Current commercial gasolines show an FL-2 rating of 70 per cent of reference fuel. §After rerunning.

TABLE 3—HYDROFINING LIGHT CATALYTIC NAPHTHA
(200°/350° F. ep.)

	Feed	Product
Sulfur	0.18	0.02
Bromine number	71	33
Gravity, °A.P.I.	48.1	49.0
C.F.R.R. octane number:		
Clear	88.9	85.9
+2 ml. TEL	94.2	93.2
C.F.R.M. octane number:		
Clear	77.5	77.5
+ 2 ml. TEL	83.3	83.3
Breakdown (uninhibited), minutes	75	375
General Motors gum, mg./100 ml.*	15	2

*Inhibited with 2 lb./5,000 gal. phenylene-diamine type inhibitor.

Hydrofining Low-Quality Naphthas

Hydrofining is particularly suited to the refining of low-quality stocks, previously considered unattractive for processing. Naphthas from low-grade crudes can be treated economically to give high-quality finished product. Low-grade heavy, high-sulfur crudes can be upgraded by a combination process of visbreaking plus fluid coking. The naphthas from such operations are unstable and have a high sulfur content.

Hydrofining of these naphthas gives markedly improved stability and sulfur reduction, with little if any loss in

TABLE 4—HYDROFINING OF A 290°/525° F. CATALYTIC TRACTOR FUEL

	Feed	Product
Sulfur, weight per cent	0.65	0.07
Preformed gum-uninhibited	175	1
Preformed + 1 lb./5,000 gal.*	196	1
Potential gum-uninhibited	288	<1
Potential + 1 lb./5,000 gal.*	192	<1
Motor octane clear	74.8	72.8
Color, TR	12	20¾

*Inhibited with phenylene-diamine type inhibitor.

leaded octane numbers. Typical data for a visbreaker and visbreaker plus coker naphtha are shown in Table 5.

With 90 per cent sulfur reduction, A.S.T.M. gum, and breakdown are markedly improved. It should be noted for the case of the visbreaker plus coker both leaded research and motor octane numbers are improved, 2.6 and 3.7 numbers, respectively. In the case of the visbreaker alone, some loss in leaded research was incurred, but the leaded motor octane improves by 1.6 numbers.

In general, coker naphthas contain large amounts of cyclic olefins and aromatics which make them potentially good hydroforming feed stocks. However, for platinum reforming, the high sulfur content of these stocks markedly

TABLE 5—HYDROFINING OF CRACKED NAPHTHAS FROM LOW-QUALITY CRUDE PROCESSED BY VISBREAKING AND FLUID COKING

Feed stock—	150°/430° F. Visbreaker		150°/430° F. Visbreaker + coker	
Quality data—	Feed	Product	Feed	Product
Gravity, °A.P.I.	46.4	47.4	46.5	48.2
Bromine number, g./gm.	50	23	48	33
Sulfur, weight per cent	1.00	0.10	1.03	0.15
Gum, A.S.T.M., Mg./100 ml.*	33	5		
A.S.T.M. breakdown, minutes*	120	1,090		1,400
Octane number:				
C.F.R.-Research, Clear	71.2	63.6	70.7	66.9
+2 ml. TEL	76.4	75.7	76.2	77.8
C.F.R.-Motor, Clear	66.2	62.4	66.0	64.9
+ 2 ml. TEL	71.8	73.6	72.4	76.1
Distillation, A.S.T.M. naphtha:				
I.b.p., °F.	207	189	199	189
10 per cent	250	248	244	241
50 per cent	322	327	316	318
90 per cent	394	402	389	394
F.b.p.	419	448	426	450

*Inhibited with 2 lb./5,000 gal. phenylene-diamine type inhibitor.

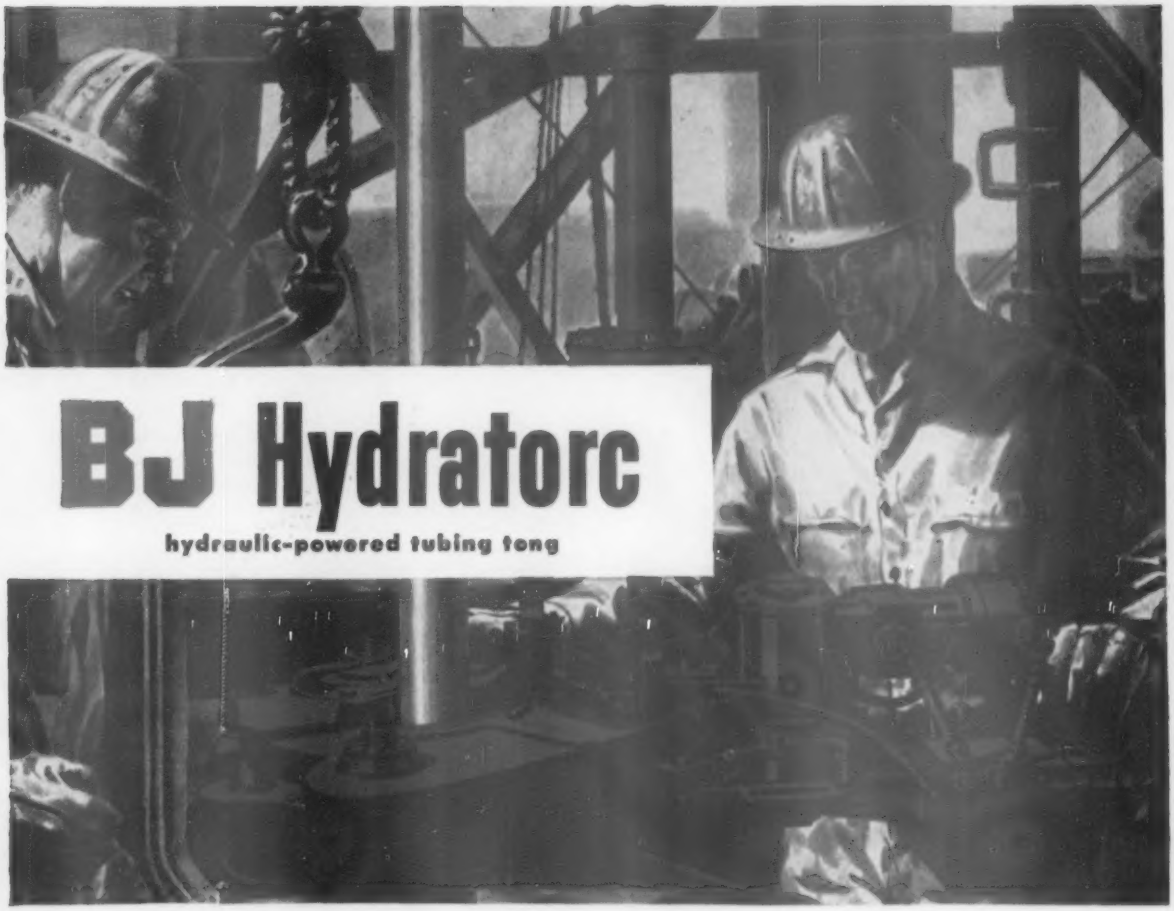

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TABLE 6—HYDROFINING COKER NAPHTHAS FOR HYDROFORMING FEED STOCKS

Feed stock—	Coker naphtha		Coker + light virgin*	
Boiling range—	250°/430° F.		C_5/350° F.	
Quality inspections—	Feed	Product	Feed	Product
Sulfur, weight per cent	1.59	0.007	0.28	0.007
Bromine number, cg./g.	90	5	23	7
Gravity, °A.P.I.	42.8	48.0	62.5	63.0
Aniline point, °F.	74	115	(‡)	(‡)
General Motors gum, mg./100 ml.†	221	7	8	5
C.F.R.-Research octane number, Clear			69.4	64.2
+ 2 ml. TEL			78.6	79.0
Hydrocarbon type analysis, volume per cent:				
Aromatics	29.4	25.0		
Paraffins	12.6	39.7		
Olefins	58.0	4.7		
Naphthenes	0.0	30.6		

*16.5 per cent C_5/350° F. coker naphtha, 83.5 per cent light virgin naphtha. †Inhibited with 2 lb./5,000 gal. phenylene-diamine type inhibitor. ‡A.S.T.M. gum, inhibited with 2 lb./5,000 gal. phenylene-diamine type inhibitor.

TABLE 7—HYDROFINING OF SOLVENT NAPHTHAS

Crude source—	So. La.		Kuwait	
	300°/400° F. e.p.		308°/400° F. e.p.	
	Feed	Product	Feed	Product
Odor	Poor	Good	Poor	Good
Sulfur, weight per cent	0.01	<.0001	0.12	<0.01

shortens catalyst life. Hydrofining coker naphthas either alone or in blend with virgin naphtha reduces sulfur to an acceptable level, as shown in Table 6.

For the coker naphtha alone, 99+ per cent sulfur reduction results in a large loss in bromine number and hence high hydrogen consumption. However, this operation is shown primarily to illustrate the hydrocarbon types present in a coker naphtha. The feed contains a high olefin content which on Hydrofining shows up as naphthenes. This indicates that a large part of the olefins present in a coker stock are cyclic. The high aromatic plus naphthene content of the hydrofined stock (55.6 volume per cent) show it to be an excellent feed stock for catalytic reforming.

Hydrofining coker naphtha in blend with light virgin naphtha is a more suitable operation, giving satisfactory desulfurization at relatively mild conditions. Anticipated catalyst life is more than 6 months without regeneration.

Solvent Naphthas

Solvent naphthas for use in dry cleaning and paint industries must have excellent odors. Hydrofining of these naphthas under mild conditions improves their odor. Even where the source of the naphtha is a sweet crude, Hydrofining may be needed to remove traces of odor. Where the source is a sour crude such as Kuwait, more severe conditions are needed to reduce sulfur to a low level as well as improve odor.

Table 7 shows the results of Hydrofining several 300°/400° F. e.p. solvent naphthas from various sources. Corrosion values of these naphthas remain virtually unchanged by Hydrofining. Catalyst life in this operation is expected to be over 12 months. The Hydrofining unit at Fawley, England, has been running 1,500 bbl. per day of sour solvent naphtha for over 8 months with no indication of loss in catalyst activity.

Commercial Application

To date, there are about 20 commercial Hydrofiners operating, under construction, or planned, with many more being considered. Of these, seven are in naphtha service. The oldest of these units is a 3,700-bbl. tractor-fuel Hydrofiner operated by Esso Petroleum, Ltd., at Fawley. This unit has been in service for about 18 months, part of which has been on diesel fuel Hydrofining.

Results from this operation have been excellent with no apparent loss in catalyst activity. Esso Standard Oil Co. has recently installed a cracked naphtha Hydrofiner at its Bayway refinery for stability and engine-cleanliness improvement. This unit has a capacity of 7,600 bbl. per day and has been in service now for 6 months. Product-quality improvements from this operation are shown in Table 8.

"Hello, B.J.—we got a gusher down here!"

TABLE 8—BAYWAY NAPHTHA HYDROFINER

Feed stock—	Heavy catalytic naphtha	
	Feed	Product
Sulfur, wt. per cent	0.20	0.14
Bromine number, cg./gm.	30	27
Engine cleanliness		
Relative sludge formation in passenger-car operation, per cent of reference*	64	41
C.F.R.-Research Octane No.:		
Clear	90	90
+ 2 ml. TEL	95	95
C.F.R.-Motor octane No.:		
Clear	79	79
+ 2 ml. TEL	84	84

*Present commercial gasolines average 50 per cent of reference.

These results are excellent with no loss in catalyst activity to date. The Baltimore refinery of Esso has two naphtha units under construction and scheduled for startup in the summer of 1955. These two units have a combined capacity of 15,000 bbl. per day, handling wide variety of stocks in blocked operation. The stocks to be treated are: light virgin, light coker, heavy cracked and heavy virgin naphtha.

Investments and Operating Costs

One of the primary aims in the development of Hydrofining was to use conditions that provide for low-cost construction and operation. In general, it is not necessary to use alloy steels for construction and long catalyst life eliminates regeneration facilities. The investment cost for a 10,000-bbl. per day plant approximates $90 to $100 per barrel. Operating costs run about 10 to 15 cents per barrel.

If it is necessary to manufacture hydrogen specifically for Hydrofining, the investment costs as quoted above are about 45 per cent higher. In certain specific instances where the operation is extremely mild, investments are as low as $70 to $90 per barrel. The reduced investment is obtained by heating the feed by exchange, thus eliminating the preheat furnace.

The economics of Hydrofining make it a very attractive process. With the current trend toward improved gasoline quality, naphtha Hydrofining can play an important role in refinery modernization plans. It is rapidly being accepted by the refiner, enjoying greater commercial application than any other hydrotreating process.

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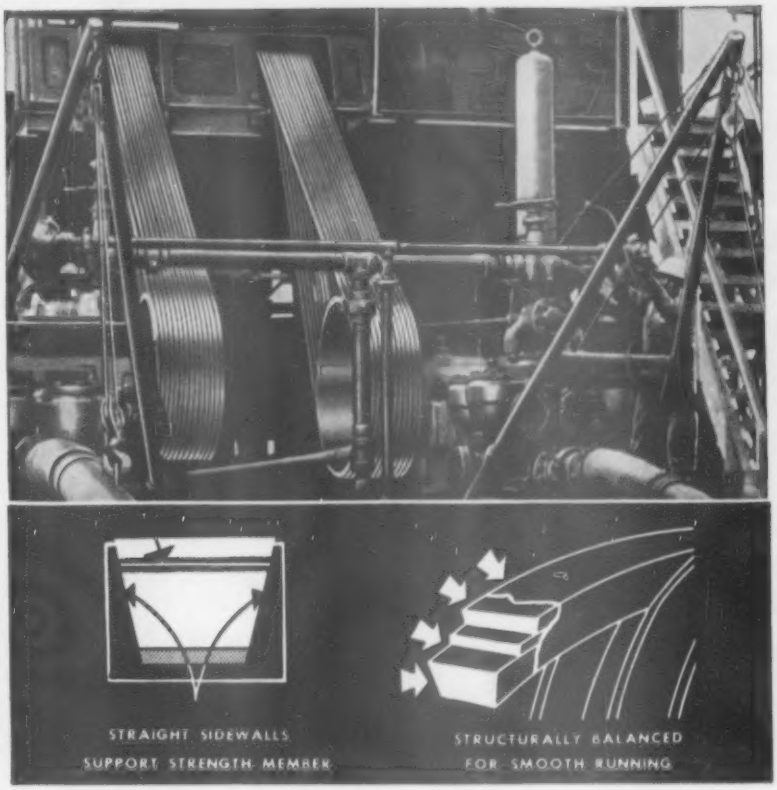

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Gas Turbines Vs. Reciprocals For Pipeline Compressors

Here's a new approach to evaluation of compressor prime movers—comparison of over-all station fuel efficiencies, per unit of gas pumped, instead of driver efficiencies only. On this basis the gas turbine is not at a disadvantage with the conventional engine. Data presented here were taken during cold weather when the turbine is most efficient. Nevertheless, comparison between turbine and piston equipment is significantly close.

by T. R. Rhea

THERE are now installed and operating about 250,000 hp. of General Electric gas turbines on gas pipelines. These have proved in their 2 years of operation to be very successful pieces of heavy-duty industrial apparatus.

There has been installed, over the past two decades, several million reciprocating horsepower on these gas pipelines. Over these two decades the thermal efficiency of the reciprocating engines has been improved considerably. Engines installed and operating in 1953 are reputed to have a fuel consumption of 8,000 B.t.u.'s per horsepower-hour and new engines now proposed are reputed to have fuel consumption of as low as 6,000 B.t.u.'s per horsepower-hour.

On the face of it, this is formidable competition for the gas turbine with generator, which has a fuel consumption on the order of 10,000 B.t.u.'s per horsepower-hour.

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How to Measure Over-All Performance in Fuel Consumption

Since the actual horsepower load on either reciprocating engines or gas-turbine centrifugals has to be calculated or inferred and cannot be measured directly, the cubic feet of fuel consumed per brake horsepower-hour is not a very satisfactory method of comparing performance. A much more direct method of comparison is described here. This method involves only the work actually done in compressing and pumping of gas, which work depends on the reasonably accurate measurement of station pressure ratios, and the gas flow through the station.

The pipeline companies are interested in the total amount of fuel a station uses to pump the flow through the station over a definite pressure ratio. Fig. 1 illustrates the elements of the over-all problem.

The total fuel going into the stations is normally measured for the prime movers, the electric auxiliaries, and camp fuel. All of this is chargeable to the job of pumping the gas.

The station pressures measured just outside the station are the pressures that move the gas to the next station and already have deducted from them losses in scrubbers, valves, bends, elbows, and station piping. It is not fair to charge pressure losses in the gas coolers to a particular station since one station may be doing the gas cooling for several stations.

Usually the dispatcher knows with reasonable accuracy the station flow in millions of standard cubic feet per day since this is measured with good accuracy.

Plotting the Gathered Data

Thus, there are available all of the essential elements to measure station over-all performance from station log sheets and no elaborate test equipment is required. It is only required to collect the data on a number of stations over a long period of time and to plot them. A plot of standard cubic feet of fuel used per thousand standard cubic feet of gas pumped against station compression ratio over a sufficiently long period of time thus gives a quick and ready means of comparing performance of several stations. With this method it is not necessary to separate out efficiency of the prime mover, the efficiency of the compressor, and other losses.

Results of tests . . . Data have been collected from reciprocating stations and gas-turbine stations and plotted in Fig. 2. These data are from four major gas pipelines and are collected and plotted directly from the station log data and published data.

The results of these tests show that the gas turbines with 25 per cent thermal efficiency driving single-stage compressors are at no disadvantage with respect to fuel consumption when compared with the best reciprocating station of the vintage of 1953. Whereas, if the thermal efficiency of the prime movers alone were considered it would be expected that the gas-turbine stations would use at least 25 to 40 per cent more fuel than the best reciprocating-engine stations. As to why the gas-turbine centrifugals show up as well as this, there can be much speculation and disagreement but there is no question but what the tests so far taken do not place the gas-turbine centrifugal at a fuel disadvantage. Some of the reasons as to what may be mitigating factors are suggested later, but more experienced pipeline operators are in a

The *Fast, Safe Practical and Inexpensive* way

TO STRAIGHTEN Kellys Drill Collars and Drill Pipe

. . . is while they hang in their normal vertical position in the derrick

And remember, a drilling string free from kinks or bends ensures more efficient operation at lower cost.

It costs far less to remove the kinks and bends from Kellys, drill pipe and drill collars *right in the derrick* while they are *suspended in a vertical position.*

And you eliminate the expense, lost time, and the always present danger of *again bending and kinking* the Kelly or drill pipe when it is laid down, trucked to the shop, and then returned to the well and pulled into the derrick.

The BAKER *Portable* Hydraulic KELLY STRAIGHTENER is easily handled by the catline, set on the rotary table, and all shapes and sizes of Kellys, drill collars and drill pipe can be quickly, practically and safely straightened in the derrick.

Send for New Folder *. . . which contains complete details, specifications and operating data. Find out why it pays all ways to do straightening at the rig.*

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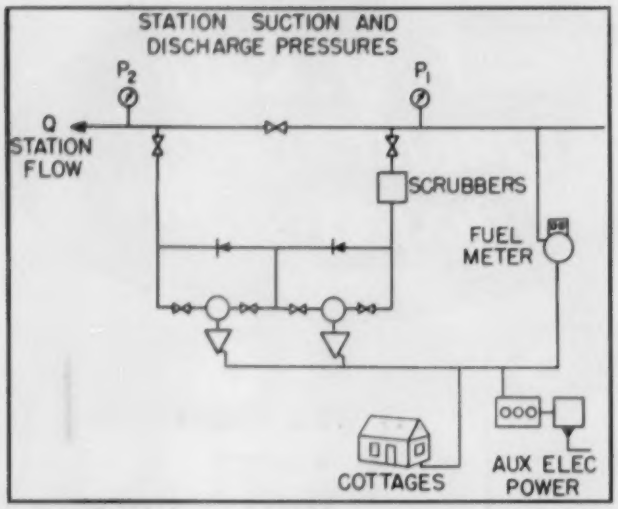
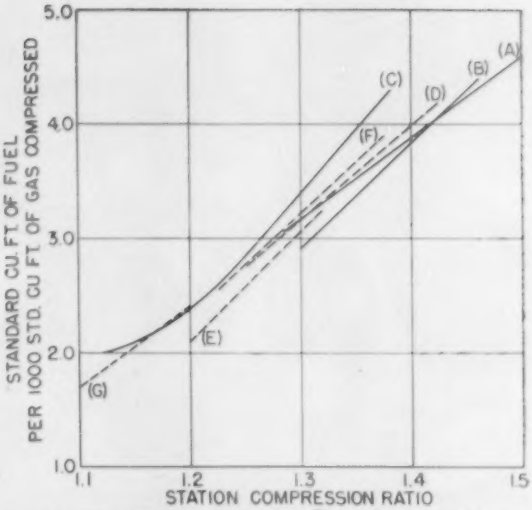


GATHERING data for fuel consumption comparison requires daily readings of P_1, P_2, Q, and fuel consumed. Fig. 1.



THESE CURVES show the test data accumulated on fuel consumed in reciprocating and gas-turbine stations. Fig. 2.

better position to evaluate these factors and add others of their own.

Discussion of Results

A plot of one gas-turbine station over a period of a month is shown on Fig. 3. On Fig. 3, each dot represents a daily average figure and this, of course, gives somewhat of a shotgun appearance since there are undoubtedly daily inaccuracies in measuring the fuel, pressure, and the station throughput. However, when an average line is drawn for the month, this should result in a fairly accurate representation for that station and wipe out many of the inaccuracies that creep into daily readings. It is only these average lines that are transferred to Fig. 2.

All of the curves have been corrected for 60° F. gas. For example, if the data were taken with a suction temperature of 88° F., the fuel consumption was reduced by 5 per cent to get an equivalent fuel consumption at 60° F. on the assumption that the horsepower necessary to compress the gas varies inversely with the absolute temperature of the entering gas.

Auxiliary and camp fuel was found to average about 6 per cent of the main engine fuel on reciprocating stations while auxiliary fuel, camp fuel, and gas for starting averaged less than 1 per cent for the gas-turbine stations.

Some of the gas-turbine stations are three-unit stations and some are single-unit stations. The reciprocating stations are from 12,000 to 25,000 hp. and most of them can be considered of 1952 or 1953 vintage.

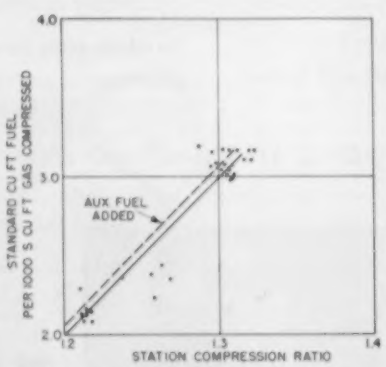
Some of the stations purchase electric power and in those cases auxiliary fuel is not included.

No correction of curves was made for any difference in B.t.u. content of the gas, effect of deviation from Boyle's law, or any difference in the gas characteristics—if such difference existed.

Why are gas turbines comparable? . . . The fact that the over-all results indicate that the gas-turbine centrifugal station and the reciprocating station use very nearly the same amount of fuel per unit of useful work done certainly indicates that it is misleading to look only at the thermal efficiencies of the prime movers. The over-all station performance is the thing that counts.

Some speculations are in order as to why a difference of 25 to 40 per cent more fuel consumption per unit of useful work done does not actually show up.

1. All of these tests were made in January 1954 with an ambient air temperature of 45°-50° F. This cool air makes the gas turbine somewhat more efficient. Also the turbines actually test somewhat better than their 25 per cent L.H.V. guaranteed value and it is in the nature of such rotating equipment to maintain their efficiency and not deteriorate with time. (L.H.V. means lower heating value or the useful heat left after some heat is lost in making steam of the products of combustion.)



TYPICAL fuel-consumption data for gas-turbine station during January 1954. Each point represents the reading for one day. Suction temperature was 59° F. Fig. 3.

Explanation of Curves

A. Tennessee Gas Transmission Co.'s best 1953 reciprocating station with 6 per cent auxiliary fuel added. The Oil and Gas Journal, May 10, 1954, page 104.
B. 25,000-hp. reciprocating station for January 1954. Auxiliary fuel included.
C. 12,000-hp. reciprocating stations for January 1954 (2 stations). 1953 installation. No auxiliary fuel included.
D. Gas-turbine stations with auxiliary fuel added, January 1954.
E. Gas-turbine stations with auxiliary fuel added, January 1954.
F. Gas-turbine station, 3 units, January 1 to 16, 1954. T. H. Pofahl, El Paso Natural Gas Co., from paper presented to American Society of Mechanical Engineers, Kansas City, 1954.
G. Gas-turbine station with no auxiliary fuel, January 1954.

2. Reciprocating engines do not always retain their highest efficiency with time because of spark plugs, piston rings, timing, and perhaps other factors as every automobile owner knows.

3. Reciprocating compressors have valve losses in the cylinders and deliver the gas in pulses; they may also have gas pulsation dampeners.

4. The operators may not always have the "pockets" in the reciprocating compressors perfectly adjusted for the compresison ratio and flow required.

References

T. H. Pofahl, El Paso Natural Gas Co., A.S.M.E. paper, June 1954.

O. H. Moore, Tennessee Gas Transmission Co., The Oil and Gas Journal, May 10, 1954, page 104.

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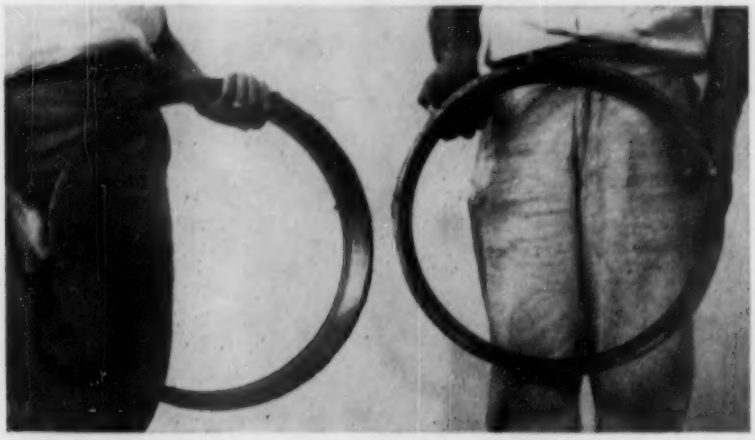
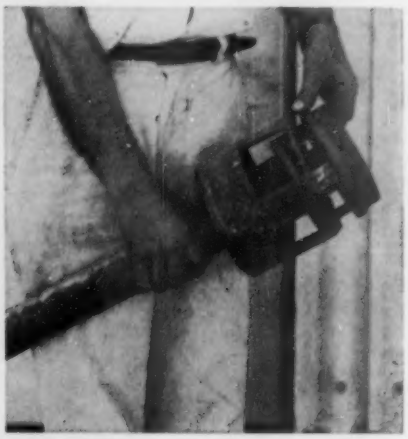


BEVELING the internal surface of the tool at left allowed better fitting of piston rings with less danger of breakage.



REMOVING governor valve seats is simplified by this tool.

FROM MAGNOLIA'S SEELIGSON PLANT—1

Short cuts in equipment maintenance

by F. Lawrence Resen
Gulf Coast District Editor

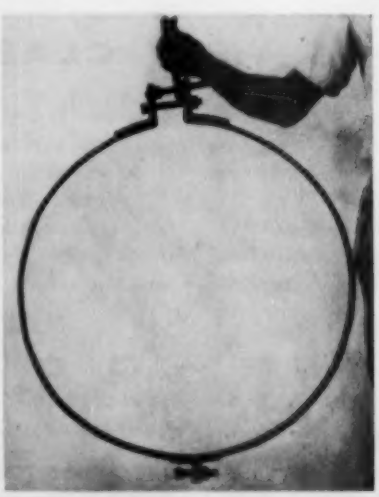
HERE are some maintenance ideas practiced at the Seeligson cycling plant operated by Magnolia Petroleum Co. in Jim Wells County, South Texas.

Piston rings . . . One modified tool, for instance, has simplified the task of installing compressor piston rings. The original tool used to compress the piston rings so they would fit into the cylinders was a short section of pipe. But the force needed to compress the rings into this space sometimes broke them.

To stop this, half of the interior of the special tool was beveled. Then a ring was gradually worked in from the beveled end—the end with the largest circumference—until it was compressed enough to slide into the unbeveled part of the tool. Finally it was slipped into position on the piston inside the cylinder as before. Now the ring is compressed gradually without too much strain.

Valve seats . . . Another tool was developed for removing governor valve seats on the DeLaval turbine. These seats have four narrow holes into which rods may be placed for unscrewing the seat. But this method often failed to exert enough force to remove a tightly made-up seat.

The new tool is simply a short length of pipe with large slots at one end. The other end is welded to a length of 2-in. pipe. The slotted end of the tool is capped by a narrow ring to which four short prongs have been welded. These prongs match up with the four holes in the valve seat. The tool is placed over the valve seat with the prongs inserted into the holes. Then a wrench is used on the 2-in. extension of the tool to unscrew the seat.

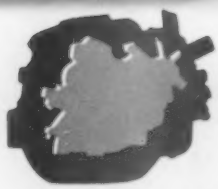


CLAMPING narrow scavenger pistons with this device prevents damage to the pistons.

If the seat is made up too tightly, the prongs may break off when too much force is applied on the tool. Should this occur, an alternate method is used. The slots on the tool are arranged so they match up with similar slots in the valve-seat extension above its threaded portion. Normally the tool will merely slide down around this extension and the prongs will do the work. But when the prongs are out of commission, extra work is involved. A short bar is slipped in between the slots. Then, as the tool is rotated by the wrench, force is transmitted through the bar to the valve-seat extension to unscrew it. The broken prongs may easily be rewelded to the tool or replaced.

Piston clamp . . . In removing scavenger pistons from compressor engines, the short length of these pistons makes them hard to support. And when ropes are used to support them, the ropes often slip off. This can result in piston damage.

To remedy this, a clamp was devised to securely support the pistons being handled. This clamp is simply a narrow length of pipe which has been cut in two and equipped with right-angle brackets welded at each end of the semicircular sections. Bolts are used to secure the clamps around the scav-



"Things are not always as they seem"

Even in the oil fields where most everything comes "king size," bigness may not always be desirable. Take power . . . there are probably 101 different jobs in Petroleum now using big, ponderous, slow-speed engines that could better use compact, higher-speed industrial power — the kind that Chrysler Industrial V-8 Engines can supply.

Chrysler Industrial V-8 Engines cost but a fraction of the cost of big slow-speed engines . . . to buy, to install, to operate and to service. Parts replacement is fast, easy, and at a fraction of the cost of replacing the same parts of the large unit.

Sound incredible? It's all true and let's see why. Modern Chrysler Industrial V-8 Engines are designed, engineered and built to operate at high speeds—speeds one and a half to two times faster than big, old-style, slow-speed engines. But, the bearing surfaces and reciprocating parts in a Chrysler Industrial V-8 Engine move no faster, are subject to no greater wear than are the moving parts in the big slow-speed engine. It's a fact, and the answer lies in the *oversquare* construction of Chrysler Industrial V-8 Engines.

By oversquare engines, we mean engines whose bore diameters materially exceed the length of their stroke. Chrysler Industrial V-8 Engines are oversquare, and the resulting short stroke reduces piston travel considerably, permitting pistons and all moving parts to operate at unbelievably slow speeds.

Then too, Chrysler Industrial V-8 Engines are built around the famed Chrysler Hemispherical-Design Combustion Chamber. This combustion chamber — exclusive with Chrysler Industrial V-8 Engines — is recognized as offering the most efficient fuel combustion of any internal combustion engine on the market today.

THE END RESULT — and the important thing to remember when you consider Chrysler Industrial V-8 Power for 101 jobs in Petroleum — is you get a smaller engine, an engine or power unit that is easier to move from one job to another, an engine that not only will do as much work as the big, *long-stroke*, slow-speed engine, but also an engine that costs much less to buy, to install and to operate.

Give serious thought to installing Chrysler Industrial V-8 Power the next time you need an industrial engine for stationary or mobile application. And remember, Chrysler Industrial V-8 Engines are finely-balanced, smooth-running engines, constructed of finely-alloyed lightweight metals, precision manufactured to meet the highest standards in the industry.

Remember too, in specifying Chrysler Industrial Power you pick engines that are factory-equipped for your requirements. For example, you may specify engines equipped with gasoline, butane or natural gas burning carburetors; velocity, belt or gear-driven governors; heavy-duty clutch and power takeoff; 3, 4 or 5-speed transmission; Chrysler gyrol Fluid Coupling or Chrysler Industrial Torque Converter. Open and enclosed power units come skid-mounted as part of their standard equipment.

A factory representative will be glad to discuss Chrysler Power with you, or you may prefer a catalog on all Chrysler Industrial Engines. Address either request to: ***Dept. 152, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

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CLEAR, ACCURATE LIQUID-LEVEL READINGS
in all tanks, boilers, vessels, containers and flow lines.

PENBERTHY REFLEX GAGES TYPE V & S

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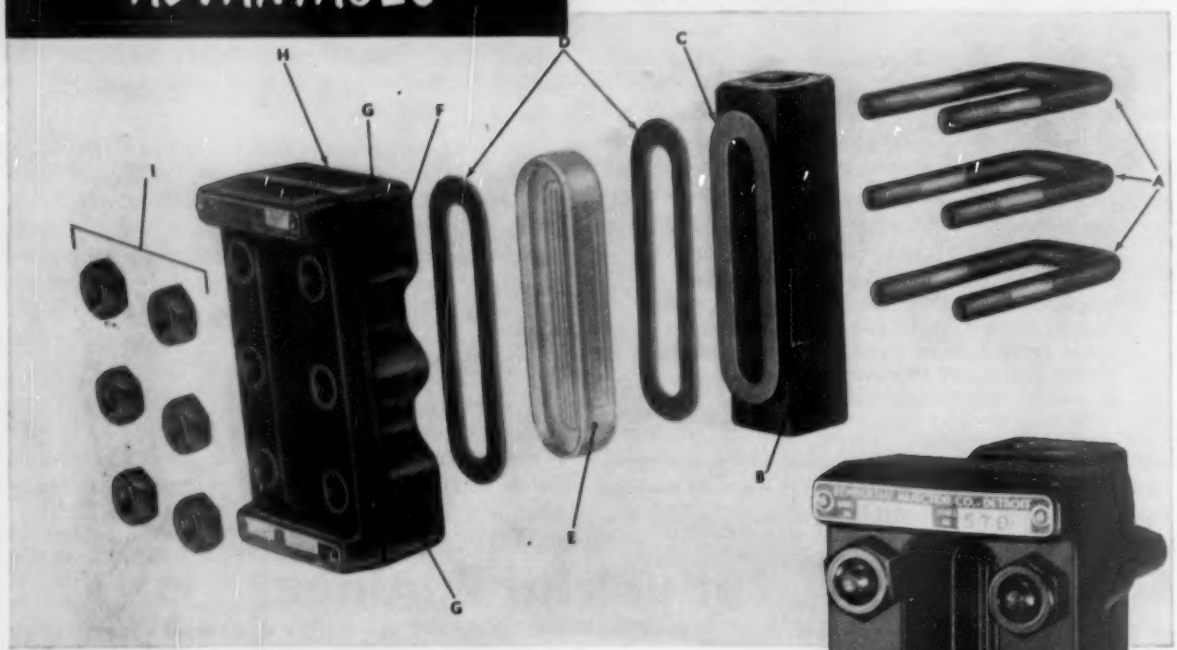
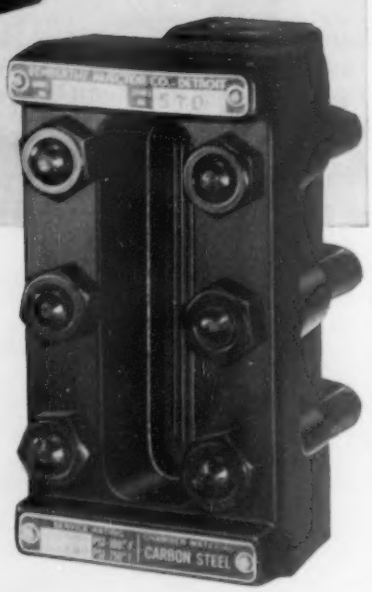
- **D** Special Composition Gaskets and Cushions are interchangeable
- **E** Resilient Band around glass centralizes it at assembly
- **F** Drop Forged Steel Frame extra heavy and rigid
- **G** Extra heavy beam at end of Frame (prevents distortion when bolts are tightened to meet high pressure service)
- **H** Frame overlaps liquid chamber at all points — provides full backing for the gasket preventing blow-outs
- **I** Alloy Steel accurately threaded nuts





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Designed for temperatures ranging from sub-zero to over 1000° F. and for test pressures exceeding 15,000 psi., Penberthy gages are used extensively for liquids ranging from water to highly corrosive and dangerous chemicals.

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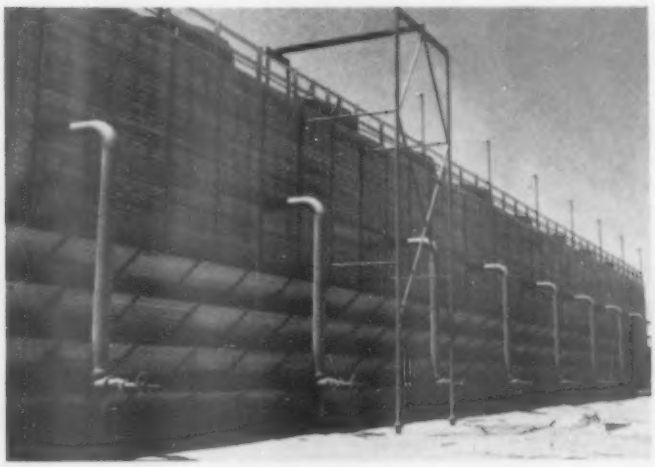
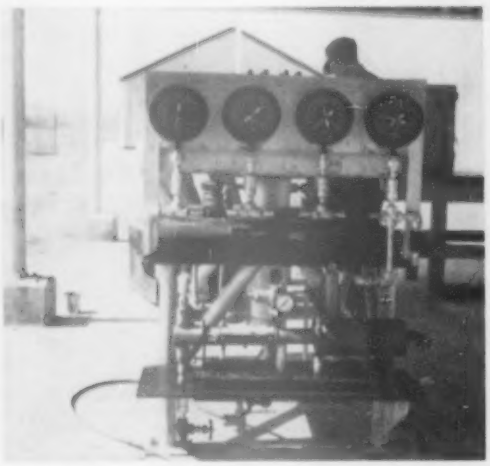


LOWERING such heavy pieces of equipment as fan motors and gear boxes can be done a lot easier with this hoist frame.



VALVE TESTING on this unit is done to all relief valves in the plant. For details see diagram below.

enger pistons. The upper bracket is equipped with an additional bolt for hooking onto a chain hoist.

Hoist frame . . . In handling large pieces of equipment on the cooling tower, the tower's height makes it hard to move such items as fan motors and gear boxes to and from the maintenance shop. To simplify the hoisting problem, a frame was constructed in the center of the tower with two legs on the ground and the other two resting on the tower. A monorail joins the two leg sections, and cross-members are provided for rigidity.

When equipment has to be lowered to the ground, it is moved to the hoisting frame and lifted clear of the tower floor by a chain hoist. The loaded hoist is then slid clear of the tower, and the equipment is easily lowered to the ground. This provides a safe, sure method of moving equipment without danger to personnel or to the cooling tower itself.

Valve tester . . . As in other modern plants, all relief valves are tested periodically. A pump, operated by an air motor, pumps water into the volume chamber to compress the air in the chamber. A line leaving the top of the volume chamber is connected to a manifold which mounts four pressure gages with capacities of 3,000, 1,000, 400, and 160 lb. respectively. These gages are used to register pressure in the volume chamber.

Valves are provided in the manifold so that low-pressure gages may be isolated from the test once their maximum pressure is reached. As a precautionary measure, blowout disks corresponding to the individual maximum gage pressure are mounted on each gage line. Should a valve accidentally be left open, excess pressure will blow out the disk but not damage the gages.

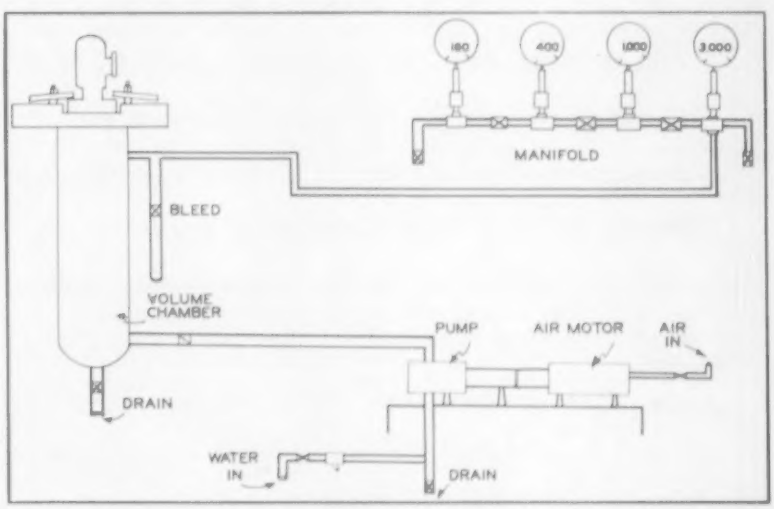
Ethane heater . . . One of the products sold from the plant is an ethane stream which is delivered into a line for transportation to a chemical plant. The ethane is discharged from compressor units at 1,000 lb. and passes through a meter run prior to leaving the plant.

At this pressure there is a deviation from the ideal gas law. To make the supercompressibility factor less pronounced, the vapor is held at a constant 200° F. on its pass through the meter run.

To accomplish this, a heater was first installed upstream of the meter run where steam may be passed over the ethane line as required. From this heater to the end of the meter run, the ethane line, valves, and flanges are covered with heavy insulation to protect the stream from temperature changes during this passage.

As a further precaution, a steam-jacketed case is used for the meter manifold and pots to eliminate any liquid dropout at this point.

A similar arrangement will be made on the customer's check meter run when it is installed. Insulation has already been applied to enough of the ethane line to accommodate this final installation. *This material will be continued in a later issue.*



HERE'S a simplified sketch of the valve-testing unit pictured above. The unit makes it easy to test all relief valves in the plant frequently.

This announcement is neither an offer to sell nor a solicitation of an offer to buy any of these Shares. The offer is made only by the Prospectus.

4,380,683 Shares

General Motors Corporation

Common Stock

($5 Par Value)

Rights, evidenced by subscription warrants, to subscribe for these shares are being issued by the Corporation to the holders of its Common Stock, which rights will expire at 6:00 P.M., Eastern Standard Time, on March 7, 1955, as more fully set forth in the Prospectus.

Subscription Price $75 a Share

The several underwriters may offer shares of Common Stock at prices not less than the Subscription Price set forth above (less, in the case of sales to dealers, the concession allowed to dealers) and not more than either the last sale or current offering price on the New York Stock Exchange, whichever is greater, plus an amount equal to the applicable New York Stock Exchange Commission.

Copies of the Prospectus may be obtained from only such of the undersigned as may legally offer these Shares in compliance with the securities laws of the respective States.

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February 9, 1955.

by R. L. Dockendorff

DRY INSTRUMENT AIR—1

Why Humble Revamped Its Air System

THIS new series will present "case history" information on the development of the dry-instrument air system at Humble's Baytown refinery. Here the facilities are extensive and varied. Lessons have been learned that may be of benefit to other operators.

- Of greatest interest in this series are the notes on dryer performance and design.
- All-electronic instrumentation is moving closer. But for some years to come, air will still be required for control-system components. Operators will be faced with air-supply problems.
- Everybody knows that industrial instruments operate better and cost less to maintain when their air supply is of good quality.
- But there may still be variations between plants as to the cleanliness, dryness, quantity, preparation, and degree of centralization that is desirable. The literature contains several treatments of design of instrument-air systems in general[1] and of gas dryers in particular.[2,3,4,5,6]
- The practice of instrument-air conditioning is quite general. The use of a central system as at Baytown is much less common. For this reason it should be of interest.

The central system may be a money-saver:

1. If you can protect against "having all your eggs in one basket."
2. If you can prevent or control the misuse of conditioned air for noninstrument uses.
3. If you are still expanding your process facilities.
4. If you have several process units fairly closely spaced which use quite a bit of air.

Justification . . . Before the central instrument-air system was completed in 1948, Baytown's facilities varied from area to area. But in no place were they really satisfactory, and in most places they were a source of frequent trouble.

Author is with the engineering division, Humble Oil & Refining Co. at Baytown, Tex. Paper presented at the Texas A. & M. process instrumentation symposium at College Station, January 25-28, 1955.

Seven small-capacity compressors were scattered about the refinery, some serving a single unit and some manifolded to supply a group of units in a high-use area. All were spared by a connection into the industrial-air system. Some of these units had high oil carryover; most of them were old and required frequent maintenance. Both electric motor and steam drivers were used.

Aftercoolers and condensate knockout vessels were provided in all cases, and some were followed by Porocel, calcium chloride, or kerosine dryers. Some of the yard-air cutins were on pressure control; some were not. Distribution was by black-iron-pipe headers. In some cases, these were quite long and allowed further cooling and condensation and permitted contamination of the air by iron rust and scale.

At this time, innumerable interconnections were placed between the instrument and yard-air lines, principally to bolster instrument-air pressure on a spot basis. These interconnections had no knockouts or other protective devices, and further air contamination was inevitable.

From 1940 to 1945, Baytown experienced many operating difficulties caused by make-shift or no instrument-air conditioning facilities. These involved down time on the light ends, fractionation and alkylation unit, naphtha fractionating unit, propane lube plant, naphtha rerun unit, and 13 associated superfractionators and cracking-coil debutanizers. In addition, F.C.C. unit No. 2 was down for 3 days due to faulty lineup involving bypassing of instrument air.

The cost to Humble of these incidents was estimated to be about $90,000—yet the weather during these years was relatively mild. Obviously, Humble could well afford to invest money to improve this record.

Late in 1946, management approval was requested for an installation to supply the instrument-air needs of all refinery process units except Baytown Ordnance Works. Inclusion of this area in the central system was deferred, partly because of its remoteness from the rest of the refinery at that time.

Instrument-Air Project

The project undertaken in 1947 and 1948 cost approximately $59,000. It consisted of the following steps:

1. Providing new trunk headers and laterals to operating units throughout the refinery.
2. Eliminating miscellaneous tie-ins between the yard-air system and existing instrument-air lines.
3. Establishing central feeder points to the new instrument-air system at Air Stations 1 and 2, taking 100 psig. air from the existing yard-air compressors.
4. Installing commercial air dryers at each air station, with auxiliary oil-knockout and dust-removal facilities.
5. Making one low-pressure-actuated tiein of yard air to the instrument header within each process unit for emergency air supply in the event of central-system failure.
6. Providing instruments for flow measurement and pressure control.

Subsequently, dew-point moisture recorders were added at each of the two air stations to monitor the operations.

Special Features

Reliability of the system was reasonably assured by these features of the plan:

1. Feeder stations . . . Air Station 1 has motor-driven compressors only. Air Station 2 has two large gas-engine-driven units in addition to several motor-driven compressors. Discharge pressure ranges from 100 to 110 psig. Motor-driven units operate from three different sources of power supply to give reasonable protection against power failure.

Meanwhile, the gas-engine units are large enough to more than satisfy dry-air needs by themselves. A preferential flow of compressed air to the instrument system has not been found necessary at Baytown, although such control has been recommended by others.

2. Transmission . . . Nominal pres-

sure in the instrument system is about 90 psig. But we are now experiencing such severe dryer-station-pressure drop that header pressures seldom exceed 75 psig. Main headers have been liberally sized (mostly 4 in.), so that the entire instrument load can be supplied from either air station alone at a pressure not less than about 40 psig. at any unit. This operation could continue for several hours since the air dryers have an on-stream cycle time of 8 hours at normal loads. Isolating valves for manual operation are provided at intervals in the main headers.

3. Supplements . . . An auxiliary air supply to each process unit is provided against the possibility of a line break or other interruption in flow from the central system. Cut in of such supplementary air is automatic. Details of these facilities are described later.

4. Operating control . . . Under the present system, the utilities department is responsible for dry air just as for any other utility. Control of dryness, cleanliness, temperature, pressure, and rate can receive the primary attention that is needed. Under the old system, air dryers if any were in an area of uncertain responsibility. As a result, they were seldom adequately attended.

A simplified flow plan for the system as it now exists at Baytown is shown in Fig. 1. Figs. 2 and 3 represent the extent and complexity of the distribution system before and after the centralization. These diagrams are approximately to scale. Over-all dimensions of the area give an idea of line lengths; the coding gives line sizing at a glance. The records show total pipe lengths added at this time to be: 1 in., 2,700 ft.; 2 in., 4,300 ft.; 3 in., 4,800 ft.; and 4 in., 3,500 ft.

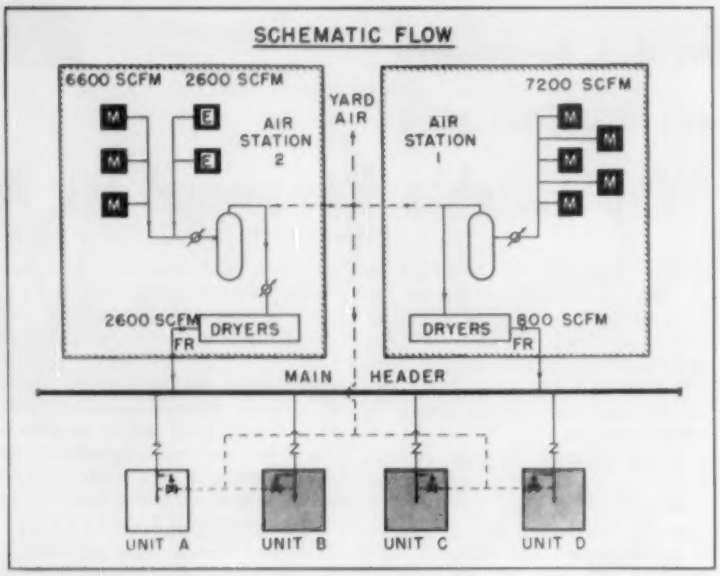

Fig. 1.

You will note the favorable location of the two air stations, with the larger capacity unit, No. 2, well suited to the presently-proposed expansion to the westward, and ultimate further expansion north-westward.

Air Station Facilities

Compressors . . . Referring again to Fig. 1, the equipment at the two air-station supply points is somewhat different. At Air Station No. 1, five relatively ancient synchronous-motor-driven compressors deliver a maximum of 7,200 standard cu. ft. per minute of air at pressure of about 100 psig. Normally, all machines are kept in operation, with automatic clearance pocket control to permit capacity regulation. Aftercooling to about 100°-110° F. in summer (70°-80° F. in winter) and condensate knock-out are provided. The nominal diversion of this air into the instrument system is 800 standard cu. ft. per minute, or about 10 per cent of the total available at this station. At times the instrument "take" has exceeded this appreciably; currently the rate exceeds 1,100 standard cu. ft. per minute much of the time. Power service to these five machines is supplied from two independent feeders, one large machine on one feeder and the other four on a second feeder.

References

1. Ludi, W. C., Petroleum Refiner, 25-10:479 (1946).
2. Amero, Moore and Capell; C.E.P. 43:349 (1947).
3. Campbell and Lawrence; Pet. Refiner, 31-8:65 (1952).
4. Campbell, Skinner, and Lawrence; Pet. Refiner, 31-10:106 (1952).
5. Eagleton and Bliss; C.E.P. 49:543 (1953).
6. Jury and Licht; C.E.P. 48:102 (1952).

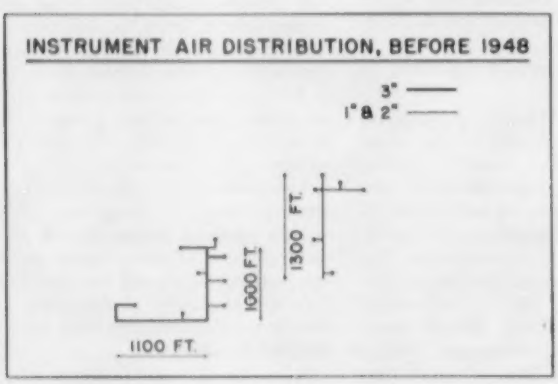

Fig. 2.

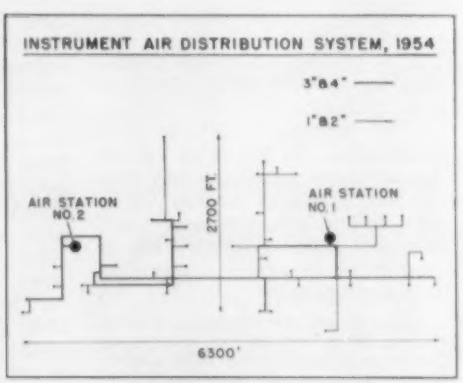

Fig. 3.

The square ends and close tolerances of Armco Casing mean quick stabbing and good alignment. Weld at collar keeps sections in alignment after they are in the hole, too.

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Two reasons for the wide acceptance of Armco Slip-Joint Surface Casing are the uniform diameter and length of each piece in the string.

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Quick delivery is another important advantage. Armco Casing is distributed by National Tank Company who will handle your order promptly for direct mill shipment. They also have 21 stocking points strategically located throughout the producing areas from which you can meet your urgent casing requirements. Diameters of Armco Casing range from 6 to 24 inches; wall thicknesses from $\frac{3}{16}$- to $\frac{1}{2}$-inch. Write us for complete data. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 4465 Curtis Street, Middletown, Ohio. 201 KOME Building, Tulsa, Oklahoma. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

First length of string of Armco Slip-Joint Casing being lifted to the rig floor. Note the float and guide shoe already attached

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by P. B. Conlan

Controlling Slime and Algae Growths—4

Summary of Control Agent Data

A WIDE variety of toxic agents are available for the control of slime and algae growths. Each toxic agent may be applied for the destruction of specific microorganisms under certain plant operating conditions. No single toxic agent has as yet been developed that will be completely effective in the control of all industrial slime and algae problems.

However, by a combination of one or more toxic agents and by combining continuous and intermittent methods of feeding these agents, slime and algae growths can be retarded.

When starting a slime and algae control program, it is important first to identify the microorganisms responsible for fouling of the system. To select the toxic agent most suitable for correction of the specific problem, complete data must be gathered on the type of system as well as on possible contaminants. It may be necessary to alternate the feed of the various toxicants at intervals to prevent development of resistant strains and to prevent development of immunity to the toxicant. Since a considerable number of toxic agents are available, each best for one specific purpose, satisfactory control of slime and algae growths can best be effected by carefully studying the problem before deciding on a definite program.

Author is with W. H. and L. D. Betz Co., Philadelphia, Pa.

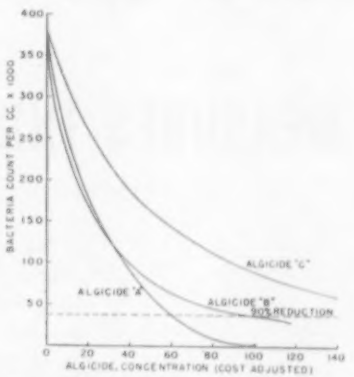

Chart shows reduction in bacterial count obtained with different types of algicides.

TABLE 2—COPPER SULFATE REQUIREMENTS FOR TREATMENT OF VARIOUS ORGANISMS

Organism—	Copper sulfate— P.p.m.	Lb./million gal.
Diatomaceae:		
Asterionella	0.12-0.20	1.0-1.7
Nitzchia	0.50	4.2
Synedra	0.36-0.50	3.0-4.2
Chlorophyceae:		
Closterium	0.17	1.4
Microspora	0.40	3.3
Ulothrix	0.20	1.7
Cyanophyceae:		
Anabaena	0.12-0.48	1.0-4.0
Clathrocystis	0.12-0.25	1.0-2.1
Microcystis	0.20	1.7
Protozoa:		
Euglena	0.50	4.2
Synura	0.12-0.25	1.0-2.1
Uroglena	0.05-0.20	0.4-1.6

(From "Use of Copper Sulfate in Control of Microscopic Organisms," by F. E. Hale, Phelps Dodge Corp., New York, 1950).

References

1. Tanzola, W. A., The Petroleum Engineer, 25, C57-60, (April 1953).
2. Smith, Marsden C., J. A. W. W. A., 43, pp. 763-769 (1951).
3. Editorial Review, Power, 98, 113-117 (February 1954).
4. "The Use of Bromine for Algae and Slime Control in the Los Angeles Plant, Styrene Division, Dow Chemical Co.," Dow Chemical Co., Midland, Mich.
5. "Water Quality and Treatment," Second Edition, New York, American Water Works Association, 1950.

TABLE 3—COMMERCIAL CHEMICALS USED FOR SLIME AND ALGAE CONTROL

Chemical name—	Chemical formula	Available form	Shipping container	Commercial strength	Solubility, lb. per gal.
Chlorine	Cl_2	Green-yellow gas, light-orange liquid	100, 150, 200, 2,000-lb. cylinders; 16, 30-ton tank cars	99.8 per cent Cl_2	0.07 (60F) 0.04 (100F)
Calcium hypochlorite	$Ca(OCl)_2 \cdot 4H_2O$	White, granular powder	5-lb. cans; 100, 300, 800-lb. drums	70 per cent available Cl_2	
Sodium hypochlorite	$NaOCl$	Light-yellow liquid	5, 13-gal. carboys; 1,300, 2,000-gal. tank trucks	12-15 per cent available Cl_2	
Sodium pentachlorophenate	C_6Cl_5ONa	Powder, briquettes, and pellets	100-lb. fiber drums (briquettes and pellets); 50-lb. paper bags (powder)	75 per cent sodium pentachlorophenate and 13 per cent sodium salts of other chlorophenols	2.75 (77F)
2,4,5-Sodium trichlorophenate	$C_6Cl_3H_2ONa$	Buff-colored flakes and fines	100-lb. fiber drums	85 per cent 2,4,5-sodium trichlorophenate, 15 per cent inert ingredients	9.42 (77F)
Copper sulfate	$CuSO_4 \cdot 5H_2O$	Crystal, lump, and powder	100-lb. bags, 450-lb. bbl., drums	99 per cent $CuSO_4$	1.6 (32F) 2.2 (68F) 2.6 (86F)
Bromine	Br_2	Reddish-brown, dense, corrosive, liquid	6.5-lb. bottles, 10-gal. Monel metal drums	99.7 per cent Br_2	0.29 (122F) 0.30 (68F)
Phenyl mercuric acetate	$C_6H_5HgOOCCH_3$	White powder	10-lb. lots, glass bottles; 10, 20, 50, 100-lb. fiber drums	96.5 per cent phenyl mercuric acetate	0.039 (68F)

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by W. L. Nelson
Technical Editor

PROGRESS IN METALS

Application of Metals and Alloys in Petroleum Refining

Part 6

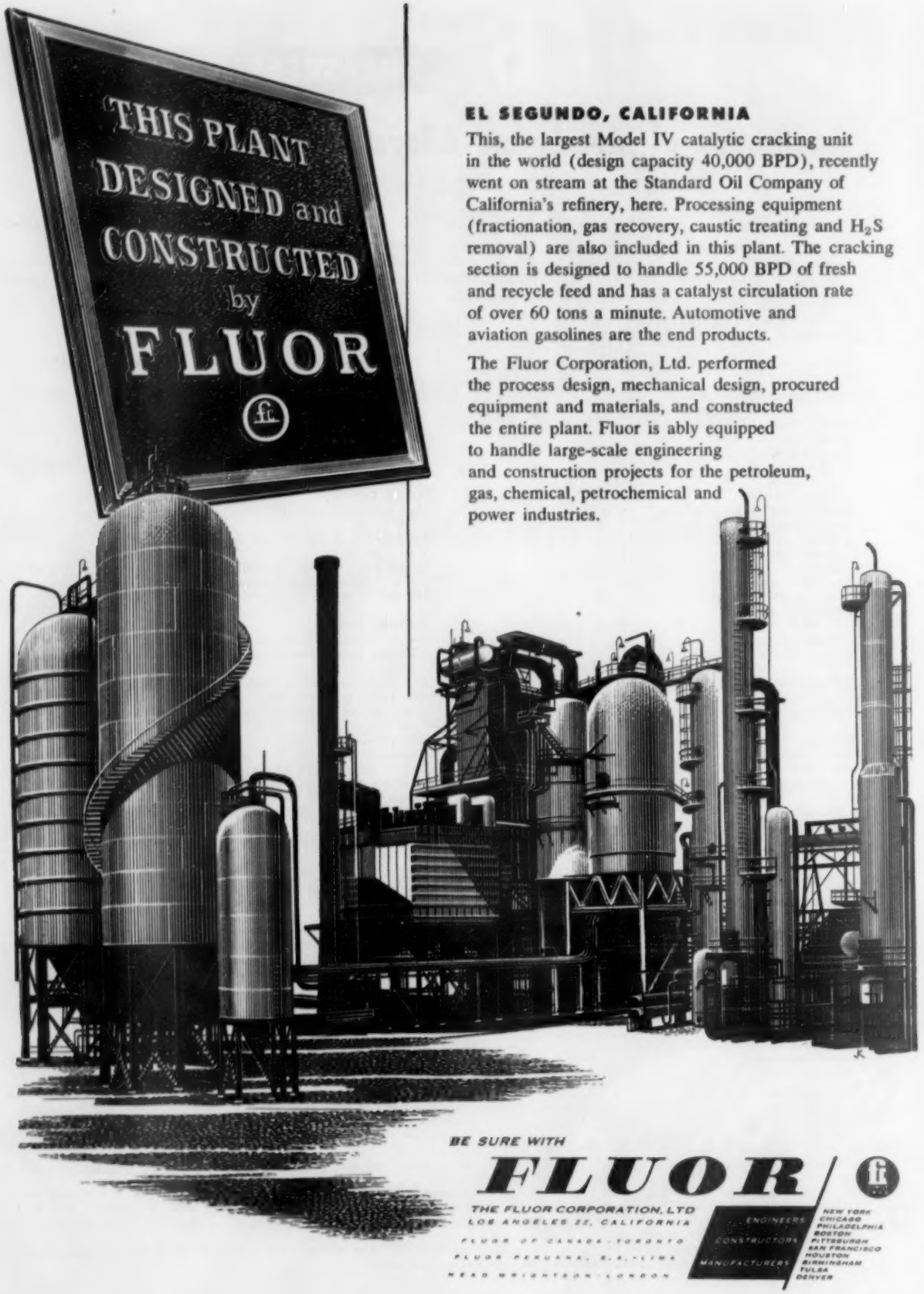
THE applications and services listed in these eight parts (September 1954-April 1955) summarize much of the material published on the Progress in Metals page since January 1953. The compositions of the various alloys or steels listed here were published in the form of an alphabetical list in the issues of September 14, 1953-January 4, 1954.

Any listing of applications will obviously be incomplete and note especially that the most common materials such as gray cast iron, malleable iron, carbon steel, ductile iron, brasses, bronzes, etc., are seldom listed even though they may be used more widely than the alloys or alloy steels.

Equipment, Corrosive Agent or Service	Some of the Materials That Have Been Employed*†
Pinions	Q and T 4620, 3140 and Ni-Cr-Mo steel
Pipe, high strength	0.2 Mo steel; 0.1 Va steel; 0.5 Cr steel; manganese steel; low Cr-Mn-Si steel
Piston, diesel	Many Ni, Cr, Va, and Mo cast irons
Piston rings	Gray cast iron and 1¼ Ni cast iron
Piston-rod nuts	Q and T 3140 steel
Plugs (return bend)	Aluminum bronze; forged steel; 22 Cr, 2 Ni, 1 Cu steel; and Monel
Propane chillers	Alclad 3-S alloy
Pumps—centrifugal	(See centrifugal pumps)
Pumps—Reciprocating:	
Bodies	Gray cast iron, 0.35 Cr and many alloy cast irons
Bodies (heavy-duty)	Cast 4340 steel
Rods	Q and T 2325, 3145 and 4140; Carb. 4615 and 4820; K-Monel
Reaction chambers	S.A.E. 6120 steel (see Vessels)
Reducing furnace atmosphere	HX (65-15) or HT (35-15) Cr-Ni steel castings
Reduction gears:	
Heavy duty	HT 4620 steel
Spiral or bevel	Carburized and HT low alloy steels
Reflux systems (topping)	Ni-Resist iron, admiralty metal, cupro nickels, Monel, Inconel, etc.
Refrigeration	(See Low-Temperature Services)
Return bends	(See Furnace, Return Bends)
Rotameters	Brass, bronze, aluminum, stainless steels, Worthite, Hastelloys, etc.
Rusting	(See Oxidizing)
Safety metals	Aluminum bronze, or beryllium copper
Salt water	Cement lined pipe, aluminum bronze, Alclad, cupro nickel
Centrifugal pump casing, impeller, etc.	Ni-Resist cast iron
Bolts	Monel, or Everdur
Pumps	Cast iron, bronze, Ni-Resist No. 1 or No. 2 iron
Tubing	Aluminum bronze
Shafts	Q and T 3140, 4620, and 1.75 Ni, 0.65 Cr, 0.3 Mo steel
Shells	(See Vessels)
Springs in brackish water	Monel or Inconel
Stack:	
Sulfur dioxide and moisture	Types 316, 302, and 304 stainless
Flare tip	Inconel
Sodium carbonate	Aluminum bronze
Sodium hypochlorite (5 per cent Cl_2 free)	Aluminub bronze, carbon (Karbate)
Sodium hydroxide:	
10 per cent at 131° F.; 67 per cent at 257° F.; 80 per cent at 275° F.	Carbon (Karbate)
30-50 per cent at 179° F.	Nickel, Monel, nickel, silver, carbon steel, and cast iron
Concentrated boiling with sulfide present	Inconel and H-Monel
Pumps	Monel
Solutizer solutions—reboilers, etc.	Monel, 2512 steel, nickel clad steel
Steam superheater, 1,400° F.	18-8 Cr-Ni steel
Steam jet ejectors	(See Ejectors)
Storage tanks:	
General	0.12 carbon steel; 0.15 Va steel; 0.5 Cr steel
Roofs, crude oil	Aluminum alloys
Corrosion resistant	Type 304 stainless (and clad), and Type 316, Monel and nickel clad
Strength, at high temperature	(See Creep Strength)

*Abbreviations—Type (302, 316, etc.) means A.I.S.I. designations. Q and T means "quenched and tempered." HT means "heat treated." Carb. means "carburized and case hardened." Numbers as 3140, 2335, etc., refer to S.A.E. steel designations. Chemical elements—C, carbon; Ni, nickel; Cr, chromium; Va, vanadium; Si, silicon; Mo, molybdenum; Mn, manganese. HX, HT, etc. are designations of the Alloy Castings Institute.

†Obviously, plain carbon steel, cast iron, brass, etc., are used for most services and they will not always be listed. Likewise, many materials have been omitted because their use has escaped notice.



EL SEGUNDO, CALIFORNIA

This, the largest Model IV catalytic cracking unit in the world (design capacity 40,000 BPD), recently went on stream at the Standard Oil Company of California's refinery, here. Processing equipment (fractionation, gas recovery, caustic treating and H_2S removal) are also included in this plant. The cracking section is designed to handle 55,000 BPD of fresh and recycle feed and has a catalyst circulation rate of over 60 tons a minute. Automotive and aviation gasolines are the end products.

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Compressor Maintenance—3

Solving Compressor Operating Problems

by H. B. DeBenedetti

IN the preceding installment, we noted the first signs which indicate a broken piston ring. Damage to cylinder walls has been overcome at Tide Water's Avon refinery by using a larger cross-section ring and avoiding cast iron wherever possible. Rings with large cross-sections withstand breaking forces better and also do not rock enough in their grooves to cut the cylinder wall rapidly. We are using bronze in place of cast iron wherever possible. We have had no breakage of bronze rings.

Cast Iron Cylinders With Aluminum Pistons

We are comparing the wear performance of cast iron versus aluminum pistons in cast-iron cylinders in two small, 150-hp., two-cylinder machines with this metallurgical combination. Measurements taken at regular overhaul periods indicate a definite difference of wear rate. We find that cylinder wear, cast iron to cast iron, is 10 times that of the cylinder using the aluminum piston. Major wear on horizontal compressor cylinders is on the vertical diameter.

About 2 years ago we bored four cylinders on another machine. We replaced the old cast-iron pistons with aluminum. Subsequent inspections through valve openings indicate a successful conversion. We have had no reason to remove these pistons in the 2 years of operation. Actual wear will be determined at the next scheduled turnaround on the machine. The results of the test will determine whether or not more aluminum pistons will be used.

The switch to aluminum pistons sometimes helps reduce the unbalanced inertia forces which are transmitted to, and cause troubles with, foundations. But this application of aluminum pistons is dependent on the design of the equipment and should be checked with the manufacturer.

Author is with Tide Water Associated Oil Co. manufacturing department, Avon refinery at Associated, Calif. From paper presented at C.N.G.A. meeting at Los Angeles.

Power Valves

At Avon we probably have had our proportionate share of maintenance difficulties with four-cycle-engine power valves. The troubles usually develop as a burned or warped valve head and eroded seat. We think we've made progress in controlling valve troubles by preventive maintenance and power-cylinder pressure checks.

Lowered seating . . . Power valves continuously dropping on their seats eventually seat deeper and deeper. Precautions should be taken to see that lowered valve-head seating does not consume valve-tappet clearance. Valves leak, stems warp, and seats and heads burn when tappet clearance is totally gone. Our control for this particular mechanical development is to check tappet clearance on each machine once each week. Closing clearances are readjusted so as to maintain proper valve lifter to valve stem gaps. This adjustment also assures even valve timing cylinder to cylinder.

We also watch and compare peak pressures developed in each power cylinder. These tests are made and recorded for firing and nonfiring conditions. What we look for is even firing pressure. Any cylinder which is low is not doing its share of power-end work. The lowered pressure usually indicates malfunctioning rings, burned valves, or a poor firing circuit. A weak or maladjusted magneto can be detected by comparing firing pressures developed in the cylinders. A magneto firing late or early will result in a weak cylinder group served by that magneto.

These tests allow us to keep informed as to the general internal condition of the combustion chamber and ignition system of the engine. If we know a particular engine cylinder is weakening, we can repair it at our convenience. In other words, we want to run the engine—not have the engine run us.

The thing to remember about these particular tests is that they are not comparative to previous readings. Readings will be different depending on the load at the time of the test. The value lies in detecting a bad cylinder at any load. All cylinders should develop relatively even firing pressures any time a test is conducted.

Power Cylinder Problems

We believe that good and trouble-free engine operation starts with blow-by control in the power cylinders. Blow-by can cause the formation of crankcase sludges, acidified lubricants, and crankcase grits. It contributes heavily to increasing the viscosity of the engine lubricant.

Blow-by also causes rapid sticking of rings (i.e., the formation of carbon in ring grooves), and accelerated wear of cylinder walls due to sticking rings. It also causes dry-piston skirt-cylinder wall operation by preventing the formation and maintenance of proper lubricating and protective films between the piston, its parts and the cylinder wall. These conditions can be caused by blow-by regardless of the type of lubricant used. In addition, blow-by results in a power loss.

Discussion in the next installment will deal with a crankcase lubrication problem which can develop. This problem originates as blow-by and finally produces failures in the crankcase.

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In actual operation, the Martin Plunger produces a buffing and polishing action. It does not score or scratch the working barrel. The perfect, trouble-free combination, is the Martin Plunger and the Martin Rubber Guide Cage. Ask your supply house for the facts — facts which prove the superiority of Martin Plungers.

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Among the

Drilling Contractors

McDuffie Drilling Co. is contracting for Vance Chandler on a new operation in the Golden Meadow area, Lafourche Parish, southeastern Louisiana. Rig is on 1 Naquin, in 6-20s-22e.

Thrasher Drilling Co., Inc., is a newly formed drilling company in the Arkansas-North Louisiana-East Texas area. Main office is at Haynesville, La. It is starting with one rig, capable of drilling to 9,000 ft. J. D. Thrasher is president; C. W. Glasscock, vice president; and Jack Bowden, secretary-treasurer.

Rocky Mountain Drilling Co., Los Angeles, is drilling for The Texas Co. on a wildcat location 1½ miles south of production in Ten Section field, southwest of Bakersfield, in Kern County, California. Location is for 1 Continental-KCL, in 5-31-26. Contract is for 9,300 ft.

Glasscock-Wilson Drilling Co., Shreveport, will drill a 14,000-ft. wildcat test in the Pointe Au Fer area, Terrebonne Parish, Louisiana Gulf Coast, for Republic Natural Gas Co. Location, at 1 Nelson, in 2-21s-11e, is about 1 mile south of production. It is in the tidal marshes near the coast line.

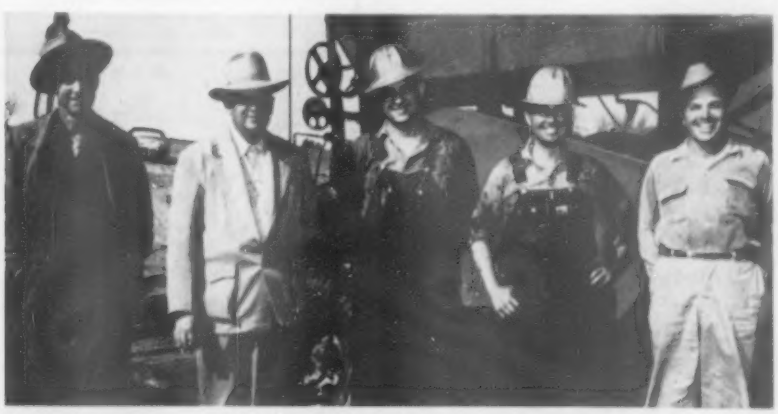
Penrod Drilling Co., Shreveport, has a new deep wildcat test under way 3½ miles northwest of Pittsburg, in Camp County, northeastern Texas. It is a contract job for Placid Oil Co. and Phillips Petroleum Co. Operators plan to carry the hole to 13,000 ft. for a Smackover test. Location, at 1 Wilson, in the A. C. Peck Survey, is 11 miles east of Smackover gas-condensate production found in New Hope field, in Franklin County.

Cooper-Herring Drilling Co. is drilling on a new wildcat test 3 miles north of Palestine, in Anderson County, East Texas. It is a contract job for Nat P. Huggins and others at 1 Fee, in the William Kimbro Survey. It is a 5,900-ft. test.

Grey-Wolfe Drilling Co., Houston, contracting for Fidelity Oil & Royalty Co., also of Houston, has a new operation under way in the east extension area of the old Savoy field, St. Landry Parish, South Louisiana. It is the third test for Fidelity in the area. The first two were completed as oil producers. Drilling depths are around 9,500 ft.

LuTex Drilling Co. will drill a 2,400-ft. wildcat test 6 miles west of Poteet, in Atascosa County, Southwest Texas, for Union Development Co., Inc., of San Antonio. Listing is for 1 Eichman, in the E. Cooper Survey.

Baker-Taylor Drilling Co., Amarillo, Tex., has a rig working on a new wildcat location 8 miles northeast of Gruver, in Hansford County, Texas Panhandle. The test is a joint venture of the contractor and Sharples Oil Corp. Plans are to go to the Morrow sands around 7,500 ft. Location, at 1 O'Donnell, in Section 81, Block 45, H&TC Survey, is a mile northeast of Sharples' recently completed Morrow gas-discov-



On location in Wetley field, Seminole County, Oklahoma, where E. M. Drilling Co., cable-tool contractor, is drilling for L. T. Green and J. A. McGee, of Abilene, Tex. Left to right: Green, McGee, Jack Hale (driller), Charles Collins (tool dresser), and E. M. Hale, owner of the drilling company.

STOP LEAKS

It is not easy to keep casing and tubing from leaking, especially in deep, high-pressure wells. The high percentage of metallic lead in 'Bestolife Lead Seal actually provides a plastic lead gasket for threads as joints are made up. That's why joints made up with 'Bestolife won't leak, strongly resist corrosion, and can easily be broken out—even years later. Your local supply store stocks 'Bestolife in 1¼, 5, 20 & 50 lb. cans. Unconditionally guaranteed.

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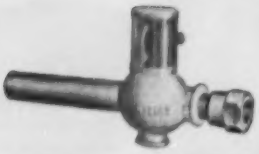

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REPAIRS

ery well, and about the same distance northwest of a Cherokee gas-discovery well by the same operator.

Truwell Servicing Co., Ltd., Edmonton, Alta., is starting a wildcat test 10 miles southeast of Grand Prairie, in northwestern Alberta Province, Canada. It is a contract job to the Cardium sand for a group of companies, headed by Canadian Decalta Gas & Oils, Ltd. Location is in LSD 11, 29-70-4w6.

Big X Drilling Co. has a rig working for Carter Oil Co. in the Grand Valley area, in Texas County, Oklahoma Panhandle. Newest operation is at 1 Campbell-Sillers, a 6,850-ft. Morrow test, in 2-1n-19eCM.

Gulf Coast Drilling Co. is drilling on a new Shell Oil Co. test in the Dixon Bay area, in the Mississippi River delta, Plaquemines Parish, Louisiana. It is Shell's 2-A State-O'Brien Unit, in 24-23s-31e. Planned depth is 9,000 ft.

Guy Mabee Drilling Co., Midland, Tex., has a new contract job working for Ryan-Davis Oil Co. at 1 Anderson, in 18-15n-52w, in Cheyenne County, Nebraska. It is a wildcat location 2 miles southwest of Itner field. **Potter Drilling Co.** is contractor on another wildcat test Ryan-Davis is putting down at 1 Payne, in 35-16n-47w, 7 miles northeast of Cook, also in Cheyenne County.

O. E. Hall Drilling Co., Wichita Falls, Tex., has a rig under contract to Amon G. Carter, of Fort Worth, for a deep test west of Keller, 10 miles north of Fort Worth, in northern Tarrant County, Texas. The test, 1 Hinton, in the Francisco Cuella Survey, will be carried to the Ellenburger, expected around 8,500 ft.

Chance Drilling Co., Inc., Houston, has a new deep wildcat operation under way for Cyprus Oil Co. in Orange County, Texas Gulf Coast. Location, at 1 Lutcher-Moore, in the George A. Patillo Survey, is 5 miles east of Vidor, and about 5 miles northwest of production at Orange. Hole is projected to 11,000 ft.

Bush Drilling Co., Eunice, La., has completed an oil producer for F. E. Jameson, of Beaumont, Tex., in the Clear Creek area, of Allen Parish, southern Louisiana, and is moving the rig a location east. The completed well, 1 Perkins, first for the operator in the area, flowed 146 bbl. of oil per day through ⅛-in. choke from sand at 8,999-9,005 ft.

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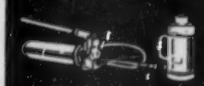

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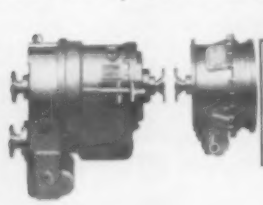
Job-time per well was cut by 15% while fuel costs dropped 20%. And the TORQMATIC DRIVES brought in new customers.

With savings like that, Producers was quick to convert a second unit in July and a third unit in August.

Producers Chemical Station Manager Jay Mays says his TORQMATIC-equipped units are "faster, stand up better, give steadier pressure and more sand-oil input into each well." He says he's standardizing on Allison TORQMATIC DRIVES for his hydraulic fracturing and big well-acidizing units.

Today there are over 200 Allison TORQMATIC DRIVE hydraulic fracturing units working in the oil fields. The TORQMATIC Converter-Transmission teams transmit engine power *smooth as steam*, give steadier pressure in the hole. The TORQMATIC Transmission *quick-shifts* at full throttle for instant changes in pressure and volume—helps operators fracture wells surer, faster, better.

Get full details on Allison TORQMATIC DRIVES for drilling, servicing and fracturing equipment from your dealer, equipment manufacturer or write direct to Allison Division of General Motors, Box 894R, Indianapolis 6, Indiana.



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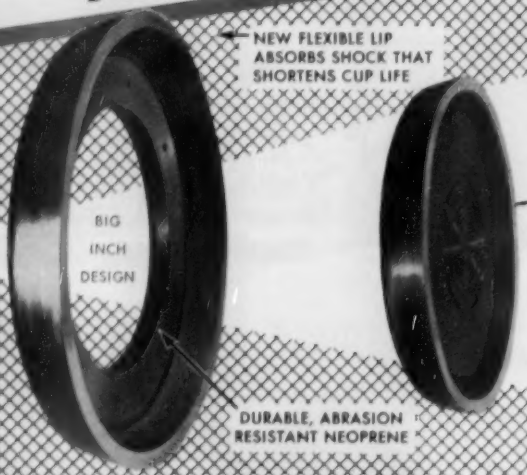

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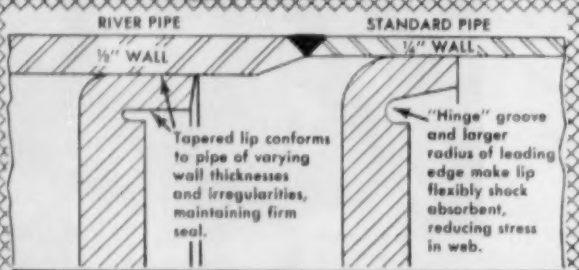
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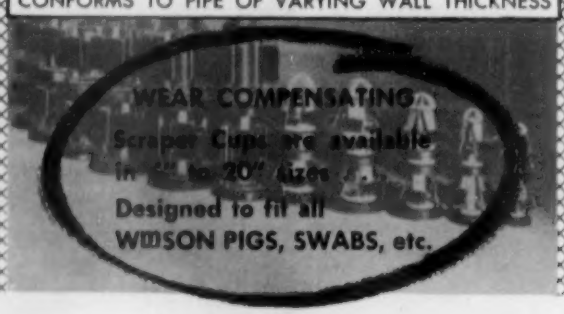

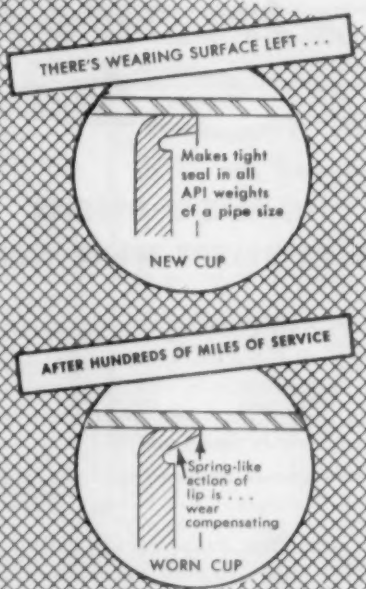
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Pipeline Patrol

. . . Report on Construction

Underwater Lines Cross Guadalupe River

United Gas Pipe Line Co. has recently finished an expansion program to increase deliveries of natural gas to the New Braunfels-Austin, Tex., area. In order to complete the work, the company had to make two underwater crossings of the Guadalupe River east of New Braunfels. The Guadalupe crossing includes one 20-in. and one 16-in. line laid in the river bed. In addition to the 47-mile section in the New Braunfels-Austin area, the company also laid 6 miles of 20-in. line to replace an existing line near New Braunfels Junction.

Under Way, Contracted, and Planned

PIPELINE activity as reported below by the Oil and Gas Journal is compiled from information received from pipeline companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by • preceding the job.

Crude-Oil Pipelines

Ar-Mex Pipe Line Co.—Company has applications for two lines before the Office of Defense Mobilization Board for rapid amortization approval.

1. A crude-oil line from Albuquerque, N. M., to Phoenix, Ariz. This line would serve a 20,000-bbl. refinery being planned by Frost & Associates of Dallas.

2. A crude-oil line from Guernsey, Wyo., to Albuquerque.

Magnolia Petroleum Co—This company will operate a 48-mile, 12-in. submarine pipeline for itself and Continental Oil Co., and Newmont Oil Co. The line will run to blocks off the coast of St. Mary's Parish, Louisiana, and will have a capacity of 50,000 bbl. per day. Brown & Root, Houston, has the contract and expects to be finished by the middle of 1955.

Minnesota Pipe Line Co.—Williams Brothers Co. has contract to build this 260-mile, 16-in. crude line from Clearbrook to Hastings, Minn. The line, to cost $12,500,000, is the southern end of a system which will move crude from Fosterton field, Sask., to Great Northern's refinery which is building in the Minneapolis-St. Paul area. Present plans call for completion by July 1955.

Standard Pipe Line Co.—Company plans to build two crude lines. Applications are now before the Office of Defense Mobilization for rapid amortization approval.

1. A 350-mile, 16-in. crude line from Glendive, Mont., to Guernsey, Wyo., to connect with Platte Pipe Line Co.'s system there.

2. A 330-mile, 16-in. crude line from Wink, Tex., to Albuquerque, N. M. This line would serve a 10,000-bbl. refinery being planned by Frost & Associates of Dallas.

• **Texaco-Cities Service Pipeline Co.**—Company has announced plans for an 8-in. 45-mile products pipeline from its West Tulsa refinery to Cushing, Okla. The company will also build a pump station at Tulsa and two 30,000-bbl. tanks at Cushing.

Texas New Mexico Pipe Line Co.—Firm has awarded contracts for 74 miles of crude lines in eastern New Mexico and West Texas. Ferguson Construction Co., of Eunice, N. M., will lay 43 miles of 8-in. from Maljamar station in Eddy County, New Mexico to Tulk pool in Lea County and Drickey pool in Chaves County, New Mexico. McVea & Barlow, Inc., Odessa, Tex., will lay 24 miles of 8 and 10-in. from Dora Roberts Ranch in Midland County, Texas, to Basin Pipe Line System's station at Midland, Tex.

Trans Mountain Pipe Line Co.—Engineers Limited Pipeline Co. has contract to lay 27 miles of 20-in. from Laurel to Burlington, Wash., and 9 miles of 16-in. of lateral to Shell Oil Co.'s new refinery at Anacortes, Wash. The $2,750,000 job will begin in spring and end in mid-summer.

• **Union Oil Co. of California.**—Planning construction of a 60-mile crude line from its

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FOR ALL PRESSURES!
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Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".

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With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

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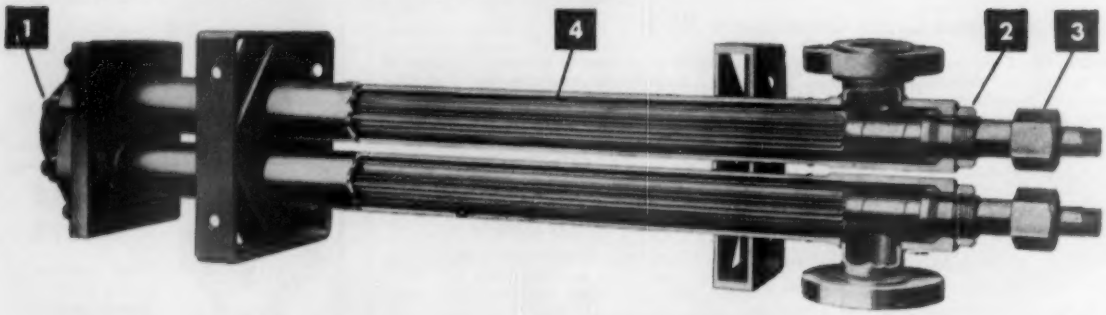
This design provides greater ease of installation, as has been proved in the service of more than 70,000 G-R Twin G-Fin Sections on a greater variety of condensing, cooling, heating and heat exchange services than any other design on the market.



To Remove Element—

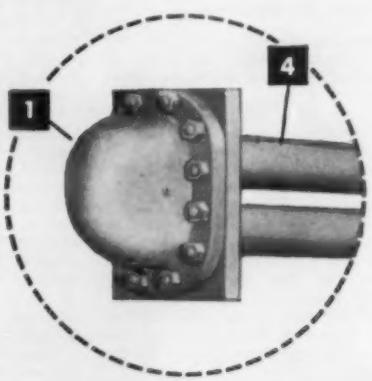
Take off shell cover (1)
Loosen and remove cone plug lock nut (2)
Loosen and remove union nut (3)
Remove element (4)

To Replace Element—

Insert element (4)
Replace and tighten cone plug lock nut (2)
Replace and tighten union nut (3)
Replace shell cover (1)

Domed Shell Cover

This type of shell cover is particularly rugged, yet weighs only 17 pounds for the small sections and 43 pounds for the standard high capacity sections.



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GR-318

Pipeline Patrol

Clara Valley field to its Wilmington refinery. 12-in. line. Bids being asked.

• **West Coast Pipeline Co.**—The off-again-on-again plans for this crude line from near Wink in West Texas to near Norwalk in California are presently before the Office of Defense Mobilization. A three-man board of nonindustry members recently recommended that the project be dropped. They questioned the ability of West Texas to produce enough crude to supply both the East and West Coasts in time of war. The three-man board favored building a line from California's Elk Hills Naval Reserve to be held in standby for possible future need.

Products Pipelines

• **American Pipe Line Co.**—Has received ODM approval to amortize 40 per cent of $178,000,000 with a rapid writeoff on proposed line to run from Gulf Coast area to New York City area. Bids for pipe requested.

• **H. W. Bass & Sons, Inc.**—Company is planning on a 152-mile, 4-6-in. L.P.G. line from Goliad Corp.'s plant in Live Oak County, Texas, to Corpus Christi.

• **California - Oregon Pipe Line System.**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

Cimarron Valley Pipe Line Co.—Subsidiary of Chicago Corp. is building an 81-mile, 6-in. products line from Chamlin Refining Co.'s refinery at Enid, Okla., to Oklahoma City. River Construction Co., of Fort Worth, is doing the work.

Great Lakes Pipe Line Co.—Company has awarded contracts in two sections on its 163-mile, 10-in. line between El Dorado, Kans., and Kansas City, Mo. Ray L. Smith & Son, Inc., are laying a 91-mile spread between El Dorado and Burlingame, Kans. M-R Co., Wichita, is working on the remaining 72 miles into Kansas City.

• **International Pipe Line, Inc.**—132 miles 8-in., proposed, Wrenshall to Minneapolis, Minn. Cost: $4,200,000.

• **Keystone Pipe Line Co.**—Company has ODM writeoff of 25 per cent for $1,875,000, 48-mile, 8-in. products line from Boot, Pa., to the Fullerton, Pa., terminal.

Malco Pipeline, Inc.—Company planning to build a 91-mile, 6-in. products line from its Prewitt, N. M., refinery to Albuquerque.

Moore Stoner Co.—Company has $2,500,000 tax amortization for a 200-mile, 6-in. products line from a connection with Oil Basin Pipe Line Co.'s terminal at Glendive Mont., to Minot, N. D.

• **Products Pipe Line Co.**—This subsidiary of Goliad Corp. has received a fast writeoff for 40 per cent of $126,000 and 25 per cent on $1,781,000 for L.P.G. line from the Wilcox natural-gasoline plant in Lavaca County, Texas, to Texas City. Panama-Williams Co. has contract. Completion scheduled for mid-summer.

Shell Pipe Line Corp.—65 miles of 12-in. products line from Baton Rouge, La., to Shell's Norco refinery. Houston Contracting Co. has contract. H. T. Muckley, Supt. Job held up indefinitely by right-of-way difficulties.

• **Sunflower Pipe Line System.**—Company proposes to build a 215-mile, 6-in. line to transport L.P.G. from six counties in western Kansas to Wichita. Application approved by Kansas Corporation Commission.

Texas Eastern Transmission Corp.—Company has asked FPC permission to abandon "Little Inch" gas line. If permission is granted, company will spend $71,000,000 converting the line to a products line with a capacity of 235,000 bbl. per day.

U. S. Gov't. Alaskan Products Pipe Line.—600 miles of 8-in. under way from Haines northward through Yukon to Fairbanks,

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Wherever there's a leak . . . you'll find a Dresser Repair Clamp is the handiest, quickest way to make a repair . . . in any weather . . . on any pipe . . . *and without shutting down the line!*

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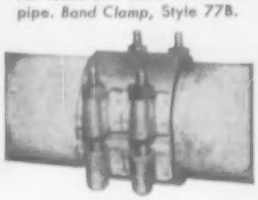
For leaks through threads of screw collars. *Collar Clamps,* Styles 4 and 41.

For leaks and holes in run of pipe. *Band Clamp,* Style 778.



For repairing leaks in asbestos cement pipe. *Hydrepair* Clamp,* Style 179.

For repairing pitholes and longitudinal splits. *Split Repair Clamp,* Style 798.

*HYDREPAIR is a trademark of Dresser Manufacturing Division.

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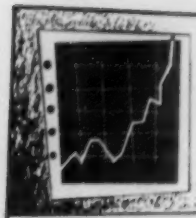

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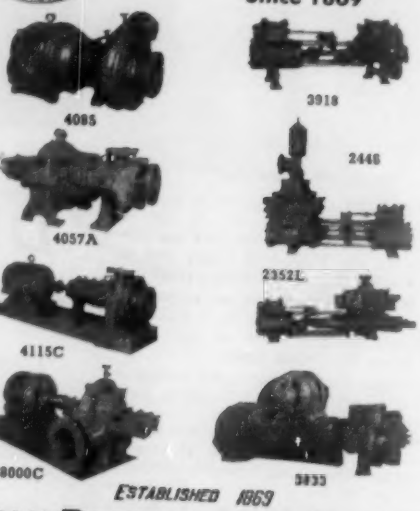

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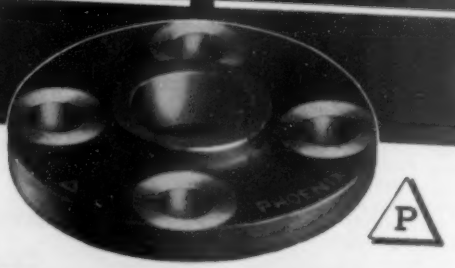
MAXIMUM STRENGTH



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PHOENIX MANUFACTURING CO.
Catasauqua, Pa. • Joliet, Ill.

Pipeline Patrol

Alaska. Williams Bros., McLaughlin, Inc., and Marwell Construction Co. are doing the work. Pipeline work completed.

Natural-Gas Pipelines

• **American-Louisiana Pipe Line Co.**—1,121 miles of 30 and 22-in., 30-in., proposed, extends from North Tepetate, Acadia Parish, Lousiana, to near Detroit. The 22-in. starts near Payne, Ohio, extends to Bridgman, Mich. Estimated cost: $130,000,000. FPC approved.

• **Arkansas Louisiana Gas Co.**—136 miles of new line proposed, to be added to present system in Arkansas, Louisiana, and Texas. Estimated cost: $9,245,166. FPC approved.

• **Carolina Natural Gas Corp.**—185 miles 2-12-in., proposed later lines off Transcontinental in North and South Carolina.

• **Central Hudson Gas & Electric Corp.**—Company has filed application with FPC to construct 48 miles of 12-in. line from Albany to Kingston, N. Y. Line will be started and completed in 1955 if FPC approves.

• **City of Dalton, Ga.**—Proposes to build 39 miles of 8-in. from a point of interconnection with Southern Natural's Rome-Calhoun transmission line. Estimated cost: $2,940,000.

• **Clinchfield Coal Corp.**—Company has filed permit with Federal Power Commission for authority to build 16-mile, 12-in. line from Dickenson County, Virginia to near Osborne Gap, Ky. The company is primarily a coal producer.

• **Colorado Interstate Gas Co.**—365 miles 22-in., approved by FPC, Green River, Wyo., to Denver, Colo., 1954.

• **Colorado-Western Pipe Line Co.**—454 miles of undetermined size pipe planned between Cortez in Montezuma County and Denver. Line would serve towns of Montrose, Gunnison, Salida, Fairplay and South Platte, Colo. Estimated cost: $30,000,000. Company also plans 254 miles of laterals to service Colorado cities not now receiving natural gas.

328-mile line, proposed, to run from a point in La Plata County in southwestern Colorado over the Continental Divide along the eastern slope to serve Pueblo, Colorado Springs, and Denver. Estimated cost: $21,600,000.

• **El Paso Natural Gas Co.**—Company has future plans for a 370-mile, $35,000,000 line from Mountain Home, Idaho, to Reno, Nev. The company will buy the gas from Pacific Northwest Pipeline Co.

• Company plans to build 74 miles of natural-gas line and 6,925 additional compressor hp. in Texas, New Mexico, and Arizona. The cost will be $13,869,017. FPC approval received.

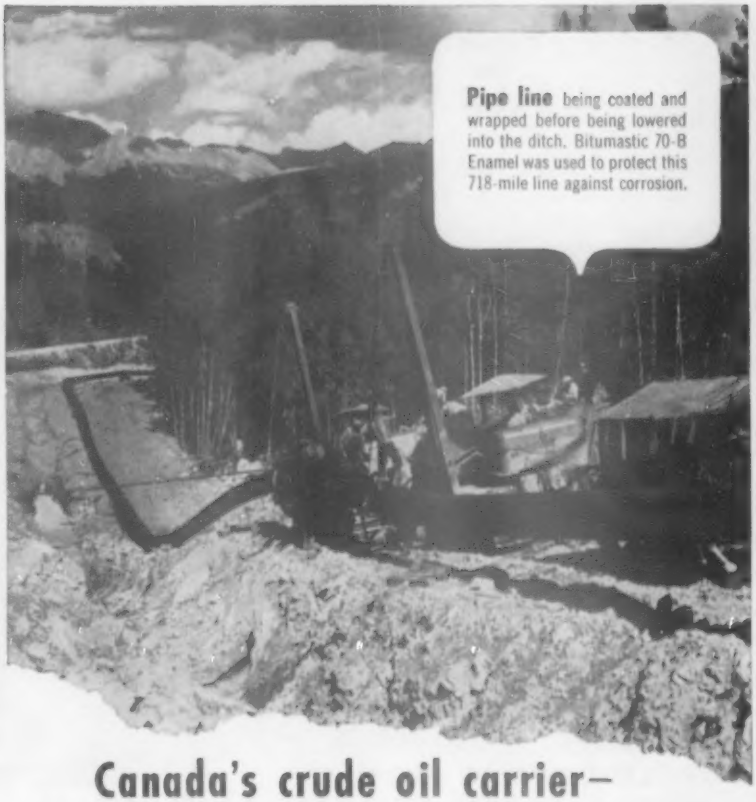
• **Hope Natural Gas Co.**—Proposing to build a 22½-mile extension of existing line from Boone County, West Virginia, to Logan-Mingo County line, West Virginia. Estimated cost: $930,000.

• **Houston Texas Gas & Oil Co.**—Company has proposed an 18-24-30-in. line from South Louisiana to Florida. Preliminary engineering, market surveys are completed. Early filing with FPC is anticipated by company.

Kansas Pipe Line Corp., Inc.—Company proposes to build 16-20-in. line to Wichita. Starting point for line has not yet been established. The line, which would have a capacity of 100 million cu. ft. daily may start in the Barber-Harper County area 100 miles southwest of Wichita, or it may be necessary for the company to go farther west to the Hugoton field. The line will cost approximately $5,000,000 and will be entirely intrastate.

• **Kansas-Nebraska Natural Gas Co., Inc.**—Proposes to construct 206 miles of 6-12-in. pipeline to add to present system in central and northeastern Nebraska.

• **Manufacturers Gas Light & Heat Co.**—



Pipe line being coated and wrapped before being lowered into the ditch. Bitumastic 70-B Enamel was used to protect this 718-mile line against corrosion.

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Trans Mountain Oil Pipe Line

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A river of oil now rolls all the way from Edmonton, Alberta, to Vancouver, British Columbia—a distance of 718 miles. Each day, more than 100,000 barrels of crude oil can be pumped through the Trans Mountain Oil Pipe Line that was recently completed.

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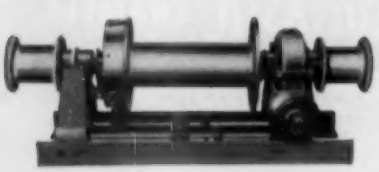

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Pipeline Patrol

40 miles, proposed, Allegheny, Washington and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., Doddridge, Wetzel and Marshall counties, West Virginia. Fulghum Contracting Co. doing work.

• **Michigan Consolidated Gas Co.** — 25 miles, 12-in., proposed, from near Sparta to Muskegon, Mich.

• **Michigan Wisconsin Pipe Line Co.**— 251 miles, proposed, 24, 18, 12, 6, and 4-in. loops. Majority will be in Wisconsin.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo. FPC approved. Est. cost; $600,000.

• **Montana-Dakota Utilities Co.**—Proposes to build 56 miles of 2, 4, and 6-in. line from its 12-in. Cabin Creek - Bismarck line near Gladstone, N. D., to the towns of Lefor, Regent, New England, and Mott, N. D.

• Proposed 34½ miles of 12¾-in. line to run from Baker-Glendive field in Montana to Rapid City, S. D., and 14 miles of 12¾-in. to replace various lines in Park County, Wyoming, and Carbon County, Montana.

Natural Gas Pipe Line Co. of America.— Company has proposed a 280-mile line from Wise County, Texas, to Panhandle field in Texas where it would connect with the NGPLCA to Chicago.

• **Natural Gas Producers, Inc.**—This subsidiary of Colorado Interstate Gas Co. has applied to the Colorado Public Utilities Commission for permission to build a 48-mile, 10-in. pipeline to link Denver with northeastern Colorado gas fields. The company will also build 3 miles of 8-in. and 10 miles of 4-in. The entire project will cost $1,374,000.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **North Dakota Natural Gas Co.**—This company has moved back into the gas picture in North Dakota with a bid to build a 274-mile, $11,017,200 system from Tioga to Fargo to Grand Forks. An original application filed several months ago was complicated by a later application filed by Northern Natural Gas Co., to serve the same area.

• **Northern Indiana Fuel & Light Co.**— 35 miles, 8-in., planned, Edgerton to Auburn, Ind.

Northern Natural Gas Co.—Company has just recently finished a large summer expansion. Still planned are:

170 miles of 20-24-in. line in Minnesota and Wisconsin running to Duluth and Superior.

400 miles of 24-in. line from the Canadian border to tie in with its system at St. Paul-Minneapolis.

500 miles of 24 or 30-in. planned across North Dakota from Tioga past Minot to Fargo and from there eastward to the Twin Cities.

• **Northwest Alabama Gas District.** — 40 miles, 9-in., proposed, Southern Natural's line through Winfield to Haleyville, Ala.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash. Approved by FPC.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

• **Pine Tree Natural Gas Co.**—204 miles of undetermined size pipe to run from the Boston area to Bangor, Me.

• **Pioneer Gas Co.**—R. H. Fulton is building 50 miles of 12-in. natural-gas line from

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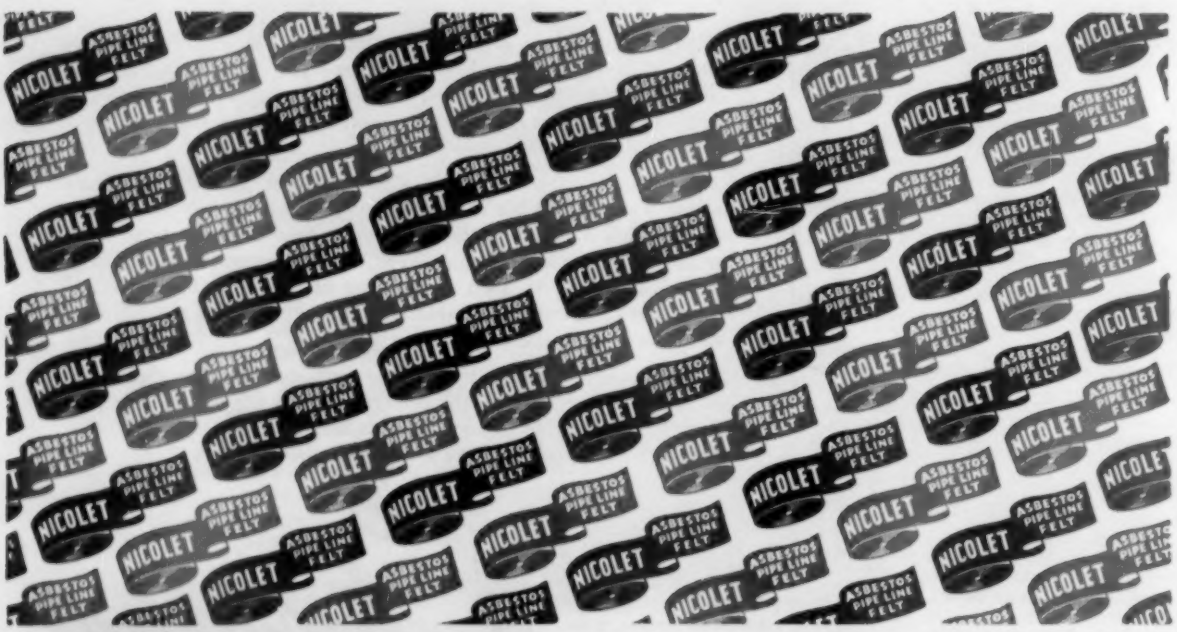

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Pipeline Patrol

fields in Goldsmith County, Texas to near Lubbock, Tex. Job expected to be finished in latter part of February.

• **Shenandoah Gas Co.**—40 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va. Est. cost: $1,470,000. FPC approved.

• **South Georgia Natural Gas Co.**—368 miles, 2-12-in., planned, Phenix City, Ala., to Tallahassee, Fla. (a) 12-in., Phenix City, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee. Est. cost: $9,000,000. FPC approved.

• **Southwest Alabama Gas District.**—150 miles, 10 and 8-in., planned, Phenix City to Dothan, Ala. Engineering Const. Co.

• **Tennessee Gas Transmission Co.**—Company has FPC authority to build 243-mile, 24-in. line from Hebron storage field in Potter County, Pennsylvania, to existing facilities near Greenwich, Conn. Company will also build an 18-mile connecting line between Hebron storage field and Harrison storage field.

Tennessee Gas Transmission Co.—Houston Contracting Co. has contract for 57 miles of 20-in. natural-gas line from Kinder, La., to near Pecan Island, La. F. A. Silar is superintendent of the 30-mile stretch from Kinder to Intracoastal Canal, and E. C. Norris is superintendent on the remaining 27 miles.

• **Texas Eastern Transmission Corp.**—Proposed, 382-mile, 24-in. line from Kosciusko, Miss., to Beaumont, to connect with the existing 30-in. line there to Connellsville and replace the "Little Inch" in moving natural gas.

• **Texas Gas Corp.**—This firm will spend $3,500,000 on a line from Orange, Tex., to a connection with a new line of Transcontinental Gas Pipe Line Corp. in Cameron Parish, Louisiana. The project will call for crossing the Sabine River, building a compressor station, and a measurement station.

• **Transcontinental Gas Pipe Line Corp.**—Company has plans for 315 miles of 36-in., 231 miles of 30-in., 23 miles of 16-in., 23 miles of 12-in. from Trenton to Woodbury, N. J. 12 miles of 24-in. to connect with Tennessee Gas Transmission's system in New Jersey. The program will loop parts of Transco's present system and will cost $80,000,000. 173 miles of the 30 and 36-in. and the 58 miles of the 12 and 16-in. lines have already received FPC approval.

• **Utah Natural Gas Co.**—Planning 40 miles from Orem to Salt Lake City, 16-in. pipe at later date. Contract not yet let.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Foreign Crude-Oil Pipelines

• **Atlas-Dresser.**—Included in this company's agreement with the Argentine Government are plans to build a 400-mile, 16-in. crude line from Plaza Huincul area to Bahio Blanca.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., contractors. (Crude and Products). Collins Const. Co. has subbed 84,000 ft. of Subaqueous work. Shutdown for Monsoon season during summer. Work was resumed September 15.

Compania Shell De Venezuela.—Company will build a pipeline from its Block I field off the western shore of Lake Maracaibo to its terminal at Palmarejo. The line will be known as "Lapline" and will run 18 miles in the lake and 27 miles on land. The underwater section will be 16-in., and the remainder will be 24-in.

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Peace River Oil Pipe Line Co., Ltd.—Company plans to build a 16-in. line connecting Sturgeon, South Sturgeon, and Little Smoky fields in Alberta to a planned 106-mile, 12-in. line which would move the crude south to Trans Mountain Pipe Line Co.'s Edson, Alta., station.

• **Petroleos Mexicanos.**—145 miles, 12-in. considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Texas Petroleum Co.—Contract has been let to Foster Wheeler Corp. and Panama-Williams for a 119-mile, 12-in. crude line to move oil from Velasquez field in Colombia to a connection with the main Andian National system at Galan. Est. cost: $6,000,000.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Boliva.

Yacimientos Petroliferos Fiscales Bolivianos.—Bolivian Government oil organization has awarded contract to Williams Brothers. Sudamericana, Ltd., to construct a 6-in. crude line from Camiri field to Yacuiba on the Argentine border. The project will cost approximately $2,500,000.

Foreign Products Pipelines

• **Empresa Nacional del Petroleo.**—80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

• **Governments of South Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

• **National Fuel Oil Co.**—This company in Israel is a shareholder in a company which plans to build a products line between Haifa and Tel Aviv. The plans call for a 55-mile, 6-in. line in which the Government would own 10 per cent.

• **North Atlantic Treaty Organization (NATO).**—This defense organization is building products lines to airforce bases in various parts of France. Approximately 2,000 miles of 4-10-in. line will be laid.

Overland Pipeline Corp.—This South African firm has requested government permission to build a 350-mile line, to cost $8,450,000, from the South African coast to Rand, a plateau area in southern Transvaal where there is heavy petroleum consumption.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in. planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

• **United States Navy Department.**—Proposed 300-500-mile line to be built in Spain to serve a proposed naval base and four large air bases which are also proposed under a defense agreement with the Spanish Government. No definite size or cost is known now.

Winnipeg & Central Gas Co.—Canadian company plans to build a $20 million butane-propane system. Company plans to get gas L.P.G. from Signal Oil & Gas Co.'s Tioga, N. D., plant and move it to Winnipeg. Size and route of the line has not been definitely established.

Foreign Natural-Gas Pipelines

Alberta Gas Trunk Line, Ltd.—This Canadian firm has let engineering contracts to two firms, Dutton, Williams Brothers, Ltd., and Mannix, Ltd., for a 300-mile, big inch gas-gathering system to collect Alberta's natural gas for transportation to Trans Canada Pipe Line Co.

Attock Oil Co.—Company plans to build 60-mile natural gas pipeline from Dhulian field to Rawalpindi in West Pakistan.

• **Empresa Nacional del Petroleo.**—80 miles, 10-in., planned, Concon to Santiago, Chile.

Petroleos Mexicanos.—205 miles 16-in. under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

Sui Gas Transmission Co., Ltd.—Morrison-Knudsen Construction Co. has contract to build 350-mile, 16-in. line from Sui field to Karachi in West Pakistan. Est. cost: $25,000,000.

• **Trans-Canada Pipe Lines, Ltd.**—Company planning 2,250 miles of 24-34-in. natural-gas line from the Alberta-Saskatchewan boundary to Toronto and Montreal. Also plans a 24-in. lateral from Winnipeg to Emerson, Man. Twenty-inch lateral from Niagara to Toronto now in operation.

Private Interests.—Proposes to build gas line from Gubik gas field near Navy Petroleum Reserve No. 4 in Alaska to Fairbanks. the line would cost $20,000,000, although later figures have been much higher than this. Line would be 450-mile, 8-in. line and Arctic Contractor, Inc., who handled engineering requirements and preliminary design estimated

• **Westcoast Transmission Co., Ltd.**—Company has signed agreement with Pacific Northwest Pipeline Corp. and has revived plans for its line from the Peace River area of Alberta and British Columbia to the United States border near Sumas, Wash. Plans call for work to begin sometime this year. Company has also announced plans for a second line to parallel the first and to swing east into the Okanagan Valley.

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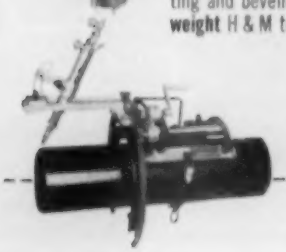

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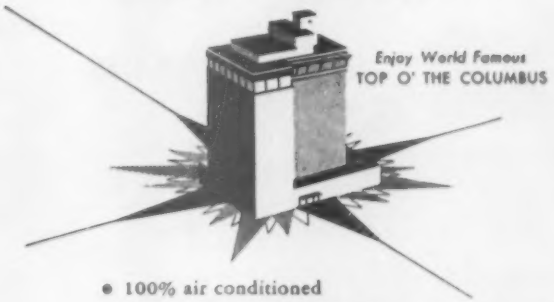

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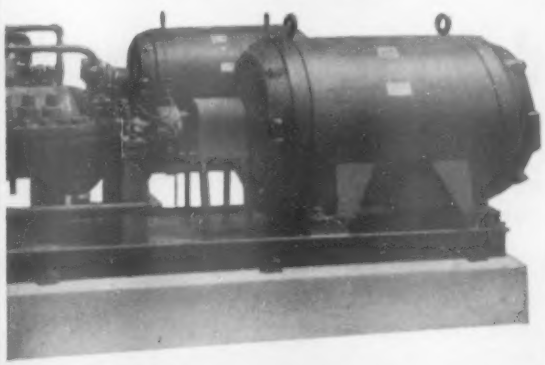

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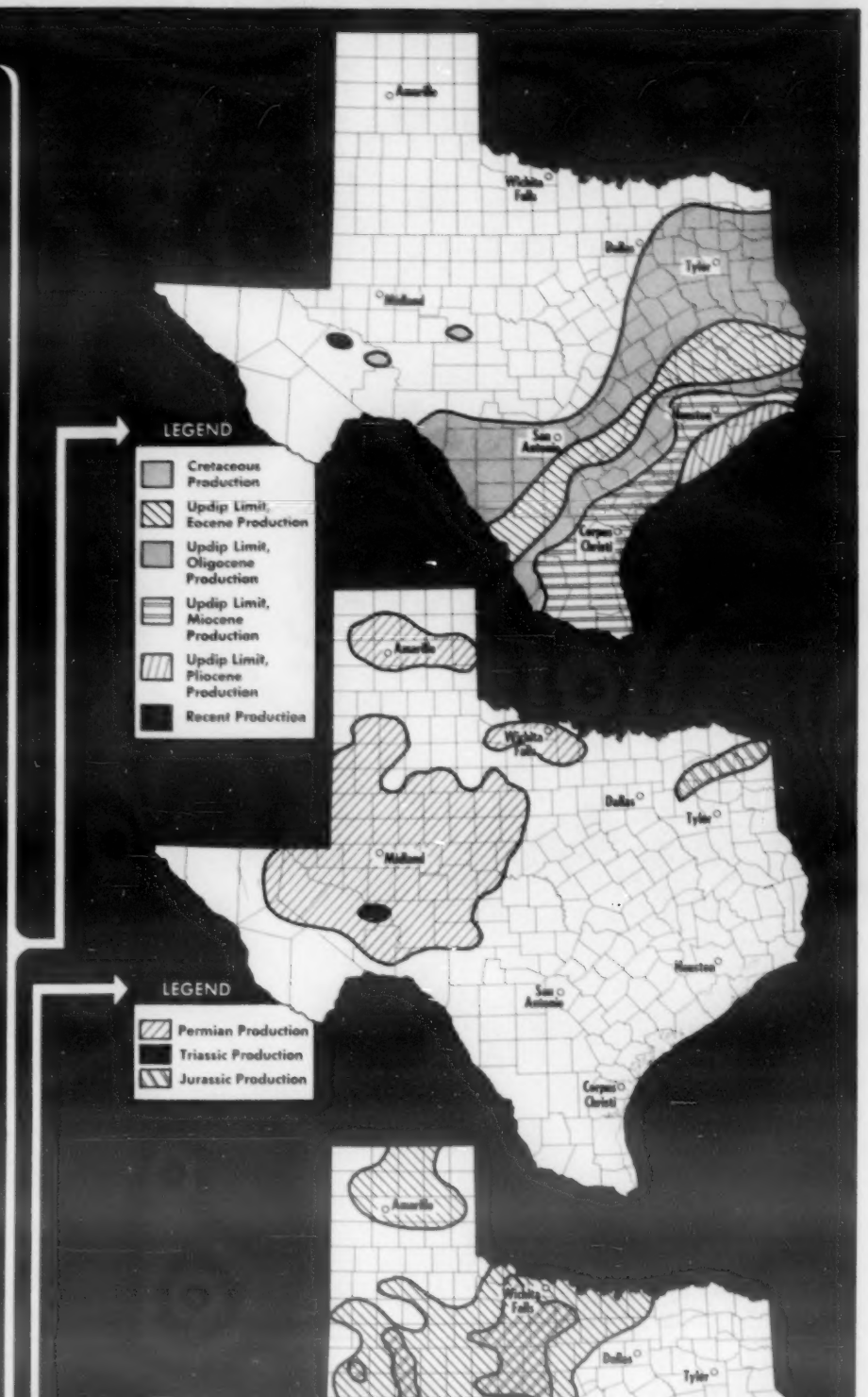
GROUP	SYSTEM	SERIES	STAGE	FORMATION	MEMBERS	COUNTIES PRODUCING (with TYPICAL FIELD for each county)
CENOZOIC	QUATERNARY	Recent				Mitchell, Pecos, Tom Green (local freak occurrences).
		Pleistocene	Houston	Beaumont		
				Lissie		
	TERTIARY	Pliocene	Citronelle	Goliad (Reynosa)	La Bahia	Chambers (Barber's Hill), Fort Bend (Big Creek), Galveston (High Island), Hardin (Sour Lake), Harris (Goose Creek), Jefferson (Clam Lake), Liberty (Esperson), Matagorda (Markham), Washington (Clay Creek).
					Lagarto Creek	
					Lapara	
		Miocene	Fleming	Lagarto		Austin (Raccoon Bend), Bee (Singleton), Brazoria (Damon Mound), Brooks (Alta Mesa), Calhoun (Magnolia Beach), Cameron (Pt. Isabel), Chambers (Cedar Point), Duval (Conoco Driscoll), Fort Bend (Needville), Galveston (Hitchcock), Hardin (Sour Lake), Harris (Dyersdale), Hidalgo (Duskam), Jackson (Collier), Jefferson (Clam Lake), Jim Wells (Brieger), Kleberg (Kingsville), Liberty (Hull), Live Oak (Hinnant), Matagorda (Sargent), Montgomery (Conroe), Nueces (Saxet), Orange (Orange), Refugio (Refugio), San Patricio (Sinton), Starr (Barbacoas), Victoria (McFaddin), Washington (Clay Creek), Webb (Staggs, Wharton (Boling), Willacy (Willamar).
				Oakville		
		Upper		Catahoula: Upper	Chusa	Aransas (St. Charles), Austin (Sealy), Bee (Blanconia), Brazoria (Old Ocean), Brooks (Fitz), Calhoun (Heyser), Chambers (Seabreeze), Colorado (Garwood), Duval (Hoffman), Fort Bend (Thompson), Galveston (League City), Goliad (Fannin), Hardin (Saratoga), Harris (Humble), Hidalgo (McAllen), Jackson (West Ranch), Jefferson (Amelia), Jim Wells (Seeligson), Karnes (South Burnell), Kenedy (McGill), Kleberg (Borregas), Lavaca (Speaks), Liberty (Cottonwood Creek), Live Oak (Hinnant), Matagorda (Coy City), Montgomery (Conroe), Newton (Gist), Nueces (Saxet), Orange (Echo), Refugio (Refugio), San Patricio (Aransas Pass), Starr (Sun), Victoria Bloomington), Washington (Brenham), Webb (Laurel), Wharton (Lane City), Willacy (Willamar).
					Solodad	
					Fant	
				Lower: Anahuac	Discorbis Heterostegina Marginulina	
		Oligocene		"Subsurface Frio"		
					Heckberry	
			Lower	Surface Frio		Aransas (Blackjack), Bee (Berclair), Brazoria (West Columbia), Brooks (Kelsey), Calhoun (Heyser), Chambers (Barber's Hill), Duval (Eagle Hill), Fort Bend (Blue Ridge), Goliad (Sarco Creek), Harris (Pierce Junction), Hidalgo (Mercedes), Jackson (Edna), Jim Wells (La Gloria), Kleberg (Borregas), Liberty (Esperson), Nueces (Stratton), Orange (Orange), Refugio (Refugio), San Patricio (Willmann), Starr (Rincon), Victoria (Coleto Creek), Wharton (Daboval).
				Vicksburg (subsurface)		
		Eocene	Jackson	Fayette	Whitsett	Austin (Raccoon Bend), Bee (Pettus), Brazoria (Manvel), Brooks (Kelsey), Duval (Seven Sisters), Goliad (Weesatche), Hardin (Sour Lake), Harris (Humble), Hidalgo (Sullivan City), Jasper (Rockland), Jim Hogg (Randado), Jim Wells (Sandia), Liberty (North Dayton), Live Oak (White Creek), McMullen (Ezzell), Montgomery (West Willis), Polk (Copeland Creek), Starr (Guerra), Webb (Bruni), Zapata (Escobas).
					McElroy (Hockleyensis)	
					Caddell	
			Claiborne: Upper	Yegua	Cockfield	Angelina (Ginter), Atascosa (Jourdanton), Austin (Raccoon Bend), Bee (Pettus), Brazos (Millican), Colorado (Chesterville), DeWitt (Burry), Duval (Benavides), Fayette (Arnim), Fort Bend (Clodine), Frio (Bonnie), Goliad (Boyce), Gonzales (Zumwalt), Hardin (Nona Mills), Harris (Durbee), Jasper (Castillo), Jim Hogg (Colorado), Jim Wells (Alice), Karnes (Hobson), Lavaca (Provident City), Liberty (Esperson), Live Oak (Dinero), McMullen (Jacob), Montgomery (Conroe), Nacogdoches (Nacogdoches), Newton (Sabine Tram), Polk (Livingston), San Jacinto (Coline), Starr (Lockhart), Tyler (Hillister), Victoria (Welder Ranch), Walker (Sam Houston), Waller (Katy), Washington (Brenham), Webb (Glen), Wharton (Egypt), Wilson (Floresville), Zapata (Lopeno).
					Middle Yegua	
					Upper Saline Bayou	
			Claiborne: Lower	Cook Mountain: Crockett	Lower Saline Bayou	
					Sparta	
				Mt. Selman: Weches		
					Queen City	
					Reklaw	
				Carrizo		
			Wilcox	Sabinetown		Angelina (Redland), Atascosa (Weigang), Austin (New Ulm), Bee (Tulsita), Brazos (Millican), Colorado (Sheridan), DeWitt (Helen Gohlke), Duval (Government Wells), Fayette (Muldoon), Goliad (Slick), Gonzales (Stulting), Grimes (Retreat), Hardin (Olive), Harris (Tomball), Houston (Kittrell), Karnes (Falls City), LaSalle (Washburn Ranch), Lavaca (Hope), Liberty (Cleveland), Live Oak (Clayton), Madison (Day), McMullen (Loma Alta), Montgomery (Lake Creek), Newton (Call), Polk (Ace), San Jacinto (Cold Springs), Tyler (Housh), Victoria (Mission Valley), Waller (San Felipe), Washington (Harvey), Webb (Retamia), Wharton (Lissie), Wilson (Acleto), Zapata (Lopeno).
				Rockdale		
				Seguin		
			Midway	Wills Point		Fayette (Pietsch), Wilson (East Floresville).
				Kincaid		
MESOZOIC	CRETACEOUS	Gulf (Upper)	Montana	Navarro	Kemp	Atascosa (Charlotte), Bexar (Alta Vista), Burleson (Chreisman), Cherokee (Lone Star), Dimmitt (Pendencia Creek), Freestone (Wortham), Frio (Big Foot), Harrison (Waskom), Marion (Caddo), Medina (Taylor-Ina), Milam (Minerva-Rockdale), Navarro (Corsicana), Panola (Bethany), Robertson (Calvert), Shelby (Ashton), Uvalde (Kinkaid), Van Zandt (Van), Wilson (Lavernia), Zavalla (Del Monte).
					Nacatoch	
				Taylor	Corsicana	
					Pecan Gap	
					Wolfe City	Atascosa (Somerset), Bexar (LaCoste), Guadalupe (Glass), Medina (Ina-Adams), Navarro (Corsicana).
					Gober	
			Colorado	Austin	Blossom	Atascosa (Poteet), Bexar (Philtop), Caldwell (Lulinz), Frio (Pearsall), Gonzales (Ottine), Guadalupe (Javeddie), Harrison (Waskom), Hill (Mount Calm), Madison (Madisonville), Panola (Bethany), Shelby (Shelbyville), Wilson (Higgins).
					Bonham	
					Ector-Tokio	
				Eagle Ford	Sub-Clarksville	Anderson (Camp Hill), Hopkins (Cono), Houston (Grapeland), Madison (Madisonville), Wood (Merigale-Paul).
			Dakota	Woodbine	Lewisville	
					Dexter	Anderson (Cayuga), Cherokee (Neches), Freestone (Steward's Mill), Gregg (East Texas), Henderson (Flag Lake), Houston (Percilla), Hunt (Wieland), Kaufman (Ham Gossett), Leon (Buffalo), Limestone (Groesbeck), Madison (Madisonville), Navarro (Powell), Busk (Pleasant Grove), Trinity (Glendale), Upshur (East Texas), Van Zandt (Van), Wood (Hawkins).
			Washita	Buda		
				Del Rio		
				Georgetown		



MESOZOIC	CRETACEOUS		Dakota	Woodbine	Dexter
		Comanche (Lower)	Washita	Buda	
				Del Rio	
				Georgetown	
			Fredericksburg	Edwards	
				Comanche Peak	
				Walnut	
			Trinity	Paluxy	
				Glen Rose	Mooringsport Ferry Lake Rodessa Pine Island Sligo Hosston
				Travis Peak	
	JURASSIC			Cotton Valley	
				Buckner	
				Smackover	
	TRIASSIC				
PALEOZOIC	PERMIAN	Ochoa	Ochoa	Dewey Lake	
				Rustler	
				Salado (Upper Castile)	
		Guadalupe	White Horse	Tansill	
				Yates	
				Seven Rivers	
				Queen	
				Grayburg	
			San Andres	San Andres	Glorieta-San Angelo
		Leonard	Clear Fork	Upper Clear Fork	Spraberry
			Wichita-Albany	Wichita	
				Lowers	
				Clyde	
				Belle Plains	
				Admiral	Dean
		Wolfcamp		Putnam	
				Moran	
				Pueblo	
	PENNSYLVANIAN		Cisco	Harpersville	
				Thrifty	
				Graham	
			Canyon	Caddo Creek	Home Creek Hog Creek
				Brad	Ranger
				Graford	Adams Branch
				Whitt	Palo Pinto
				Lone Camp	Garner
			Strawn (Des Moines)	Millsap Lake	Grindstone Creek Lazy Bend
				Lower Strawn	Dickerson Caddo
			Bend (Atoka Series)	Bend	Smithwick Marble Falls
	MISSISSIPPIAN			Chappel	
				Caney	
				Barnett	
	DEVONIAN		Hunton	Percha	Upper Hunton
				Canutillo	Middle Hunton
	SILURIAN			Fusselman	Lower Hunton
	ORDOVICIAN	Upper	Upper	Montoya	
		Middle	Simpson	Bromide	
				Tulip Creek	McKee
				McLish	Waddell
				Oil Creek	
				Joins	
		Lower	Ellenburger	Ellenburger	
	CAMBRIAN			Honeycut	
				Point Peak	
				Morgan Creek	
				Wilberns	
				Welge	
				Hickory	
				Lion Mountain	
				Cap Mountain	
				Riley	
				Hell	
MISCELLANEOUS	Caprock on salt domes				
	Serpentine plugs				

Anderson (Cayuga), Cherokee (Neches), Freestone (Steward's Mill), Gregg (East Texas), Henderson (Flag Lake), Houston (Percilla), Hunt (Wieland), Kaufman (Ham Gossett), Leon (Buffalo), Limestone (Groesbeck), Madison (Madisonville), Navarro (Powell), Rusk (Pleasant Grove), Trinity (Glendale), Upshur (East Texas), Van Zandt (Van), Wood (Hawkins).

Caldwell (Bob Rose), Falls (Chilton), Frio (Pearsall), Guadalupe (Spillar), Madison (Fort Trinidad), Trinity (N.W. Glendale), Wilson (Mosser).

Frio (Pearsall), Gonzales (Nixon), Houston (Fort Trinidad), Madison (Madisonville), Shelby (West Shelbyville (?).

Atascosa (Imogene), Caldwell (Luling), Falls (Cow Bayou), Frio ((Pearsall), Gonzales (Nixon), Guadalupe (Darst Creek), Lee (Tanglewood), Milam (Gause), Trinity (Glendale).

Franklin (Lakeview), Grayson (Pottsboro), Hopkins (Sulphur Bluff), Hunt (Campbell), Kaufman (Walter Fair), Marion (Caddo), Pecos (Toborg), Shelby (Ashton), Smith (Chapel Hill), Titus (Talco), Wood (Quitman).

Anderson (Cayuga), Camp (Pittsburg), Cass (Rodessa), Cherokee (Jacksonville), Edwards (Wardlow Ranch), Franklin (New Hope), Freestone (Red Lake), Gregg (Willow Springs), Harrison (Woodlawn), Henderson (Opelika), Hopkins (Pickton), Kaufman (Ham Gossett), Limestone (Barron), Marion (Rodessa), Maverick (Chittim), Nacogdoches (Trawick), Navarro (New Richland), Panola (Carthage), Rusk (Henderson), San Augustine (San Augustine), Shelby (Patroon), Smith (Chapel Hill), Tom Green (North Christoval), Van Zandt (Tundra), Wood (Winnsboro).

Anderson (Blackfoot), Camp (Pittsburg), Freestone (West Teague), Harrison (Waskom), Marion (Lassater), Nacogdoches (Appleby), Panola (Carthage), Rusk (Henderson), Smith (Chapel Hill), Van Zandt (Myrtle Springs).

Bowie (Eylau), Franklin (New Hope), Rains (Ginger).

Pecos (Yates).

Andrews (Fullerton), Archer (Hollidays), Borden (Gail), Callahan (Baird), Carson (Panhandle), Clay (Petrolia), Cochran (Levelland), Coleman (Dunham & Young), Concho (Hartgrove), Crane (Sand Hills), Crockett (World), Culberson (Rustler Hills), Dawson (Welch), Ector (Goldsmith), Fisher (Rotan), Foard (Thalia), Gaines (Seminole), Garza (Garza), Glasscock (Spraberry), Gray (Panhandle), Hale (Anton-Irish), Hartley (Panhandle), Haskell (Gillespie-Rockdale), Hockley (Slaughter), Howard (Howard-Glasscock), Hutchinson (Panhandle), Irion (Dove Creek, South), Jones (Noodle, South), Kent (Connell), Lamb (Littlefield), Loving (Wheat), Lubbock (Lee Harrison), Martin (Mabee), Midland (Spraberry), Mitchell (Westbrook), Moore (Panhandle), Pecos (Yates), Potter (Panhandle), Reagan (Big Lake), Reeves (Chapman), Schleicher (Tankersley), Shackelford (Coates), Scurry (Sharon Ridge), Sterling (Clark), Sutton (Brushy Top), Taylor (Merkel), Terrell (Hoge), Terry (Corocoi), Tom Green (Funk), Upton (McElroy), Ward (North Ward), Wheeler (Panhandle), Wichita (Burkburnett), Wilbarger (South Vernon), Winkler (Hendrick), Yoakum (Wasson).

Andrews (Shafter Lake), Archer (Luke), Baylor (Seymour), Borden (Good), Brown (Blake), Callahan (Morrisett), Carson (Panhandle), Clay (Burns), Cochran (Landon), Coke (Jameson), Coleman (Santa Anna), Comanche (Kirk), Concho (Eden), Cooke (Kimbell-Sims), Crane (East Dune), Crockett (Todd), Dawson (Mungerville), Denton (Bolivar), Dickens (Girard), Eastland (Bankline), Ector (Addis), Erath (Aron), Fisher (McCaulley), Floyd (Floydada), Foard (Johnson), Gaines (Doss), Garza (Spur), Gray (Panhandle), Grayson (Sherman), Hale (Petersburg), Hamilton (Pottsville), Hansford (Grover), Hardeman (Chillicothe), Hartley (Panhandle), Haskell (Judd), Hockley (Ropes), Howard (Vealmoor), Hutchinson (Panhandle), Irion (Tankersley), Jack (Bryson), Jones (Avoca), Kent (Salt Creek), Kimble (Bolt), King (Bateman Ranch), Knox (Knox City), Lynn (O'Donnell), Martin (Glass), McCulloch (Lohn), Menard (Morrow), Midland (Parks), Mitchell (Dunn), Montague (Bowers), Moore (Panhandle), Nolan (White Flat), Ochiltree (McGarraugh), Palo Pinto (Strawn), Parker (Buzz), Pecos (White & Baker), Potter (Panhandle), Reagan (Benedum), Roberts (Lips), Runnels (Fort Chadbourne), Schleicher (Hulldale), Scurry (Snyder), Shackelford (Hubbard Creek), Sherman (Bivins), Stephens (Breckenridge), Sterling (Iolanthe), Stonewall (Boyd), Sutton (Miers), Taylor (Reddin), Terrell (Hoge), Terry (Wellman), Throckmorton (Swenson), Tom Green (Harriett), Upton (Pegasus), Wichita (K.M.A.), Wilbarger (Consolidated), Wise (Chico), Young (Kendall).

Archer (Scotland), Baylor (Freeport), Borden (Red Fork), Callahan (South Putnam), Clay (Stephens), Comanche (Bibb), Eastland (Aaron), Gaines (Florey), Glasscock (Garden City), Haskell (Northwest Sagerton), Howard (Luther, Southeast), Jack (Alco), Lynn (O'Donnell), Shackelford (Elliott), Stephens (Atkins), Sterling (Spade), Stonewall (Aspermont), Taylor (Kenberg), Throckmorton (Dickie), Wilbarger (Bugscuffle), Winkler (Bouldin), Young (Knox).

Andrews (Three-Bar), Borden (Borden), Cochran (Landon), Crane (Block 31), Crockett (Lula), Dawson (Adcock), Ector (TXL), Gaines (Jenkins), Martin (Block 7), Midland (Sweetie Peck), Pecos (Pecos Valley), Terry (Alsabrook), Winkler (Keystone), Yoakum (Bronco).

Andrews (Midland Farms), Crane (C-Bar), Crockett (Block 47), Dawson (Adcock), Ector (Penwell), Midland (Sweetie Peck), Pecos (Pecos Valley), Reagan (Big Lake), Terry (East Corrigan), Upton (Adams), Ward (Shipley), Winkler (Keystone).

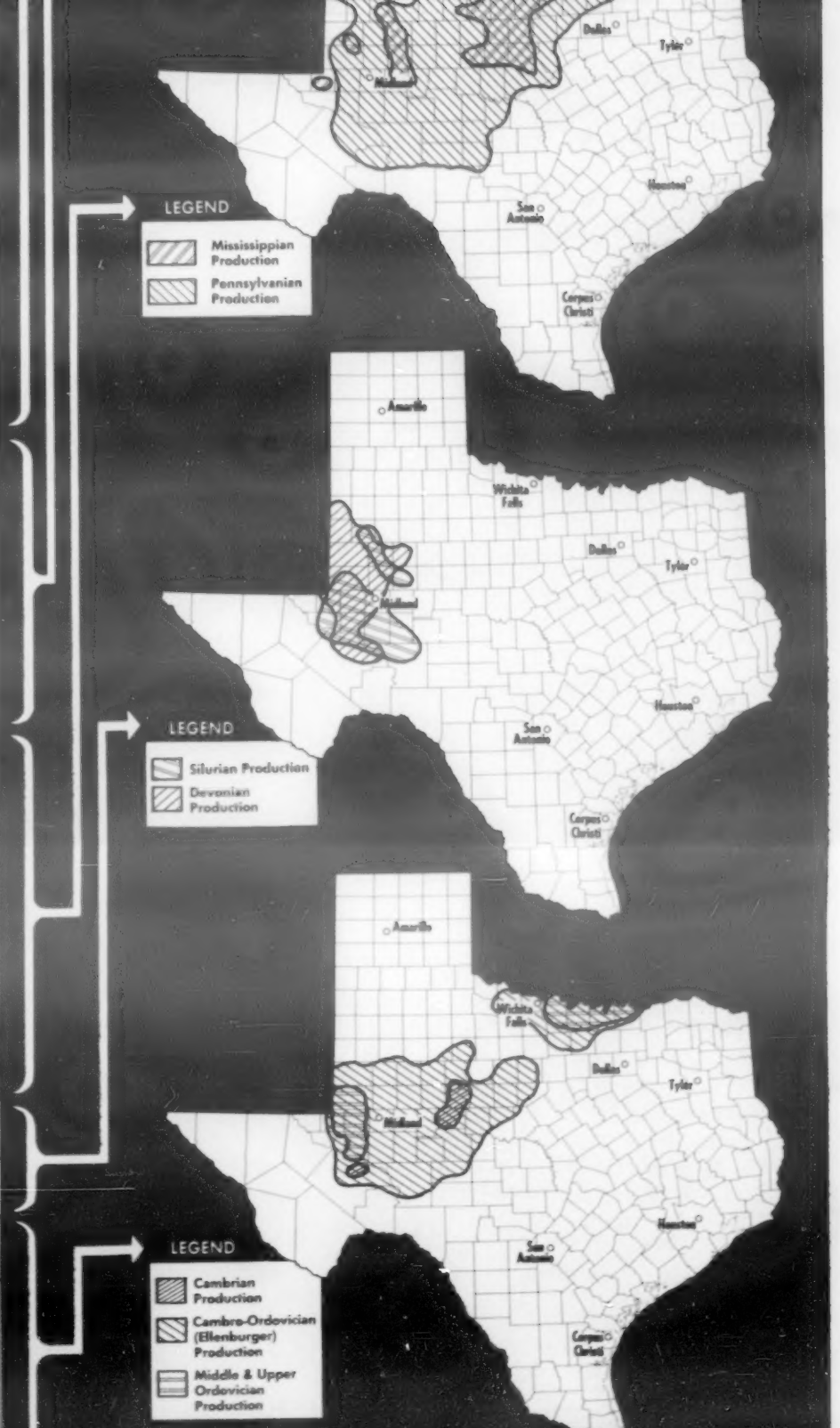
Andrews (Martin), Clay (Bryant), Cooke (Walnut Bend), Crane (Block 31), Ector (TXL), Grayson (Sandusky), Montague (Hildreth), Pecos (Abell), Winkler (Keystone).

Andrews (Shafter Lake), Archer (Maag), Borden (Fluvanna), Callahan (Baum), Clay (Heard), Coke (Bronte), Coleman (Burt-Ogden-Mabee), Cooke (Bindel), Crane (Sand Hills), Crockett (Todd), Eastland (Pippen), Ector (TXL), Fisher (Pardue), Gaines (Flanagan), Grayson (Sandusky), Irion (Kingsley), Jack (Campsey), Lynn (O'Donnell), Midland (Pegasus), Mitchell (Dockery), Montague (Lone Prairie), Nolan (Lake Trammell), Pecos (Apco), Reagan (Big Lake), Runnels (Ballinger), Schleicher (University 101), Scurry (Winfield), Shackelford (Mugginsville), Stephens (Eolian), Sterling (Spade), Stonewall (Boyd), Taylor (North Blair), Tom Green (Walling), Upton (Wilshire), Ward (Monahans), Wichita (K.M.A.), Wilbarger (Electra), Winkler (Kermit), Wise (Daly).

Coke (Rawlings), Nolan (North Dora).

Chambers (Barbers Hill), Galveston (High Island), Hardin (Batson), Jefferson (Spindletop), Liberty (North Dayton), Matagorda (Markham), Wharton (Boling).

Bastrop (Hilbig), Caldwell (Lytton Springs), Guadalupe (Mansford), Medina (Dunlay), Milam (Holcomb), Travis (Kimbro), Williamson (Noack).



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. . . What's New in Equipment?

Use the handy Time-Saver Cards ✔✔✔ to obtain additional information on these items

by Dan B. Miller

Unit Crane Introduces New Model 510

A new ⅜-yd. Unit Challenger Model 510 embodies the features of: hydraulic clutch control; full-floating, trunnion-mounted, tapered drums; self-aligning hook shoes that distribute applied pressure over a maximum bearing area; force-feed lubrication; interchangeability of parts; full-range-vision safety cab with large side entrance; and Ford heavy-duty industrial engine with torque converter.

Established features, such as the one-piece cast gear case, straight-in-line engine mounting, involute splines, and drop forged parts, are also incorporated. *Unit Crane & Shovel Corp.*

Check No. 1 On The Time-Saver Card

New Tong Features Fewer Jaw Changes, Strength

A new Type DD rotary tong is for drill pipe and drill collars from 4 to 17-in. o.d. The main benefits stressed for this tong are extra strength, greater size range, and fewer jaw changes.

The Type DD tong with weight of approximately 650 lb. is balanced for easy handling and features the exclusive gooseneck hanger with simple longitudinal and lateral adjustment for perfect suspension.

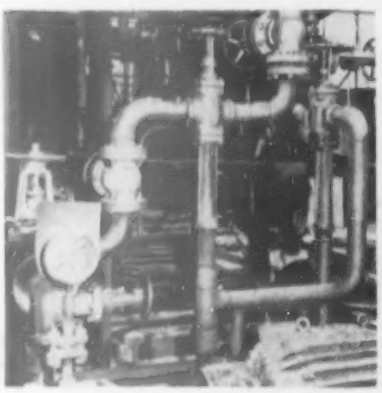
The lub jaw features a three-hole adjustment for a range from 4 to 8½ in. With this design and two-step lug-jaw construction, this tong is easily adjusted to assure maximum gripping efficiency. By the addition of three lug jaws and one hinge jaw, the range can be increased through 17-in. o.d.

The heavier jaw construction including the 2-in. diameter hinge pins permits the application of greater torque to meet the most severe operating conditions. The concave lug-jaw design assures positive latching under any and all working conditions. *Byron Jackson Co., Oil Tool Division.*

Check No. 2 On The Time-Saver Card

Continuous Pipeline Heater Produces 100° F. Rise

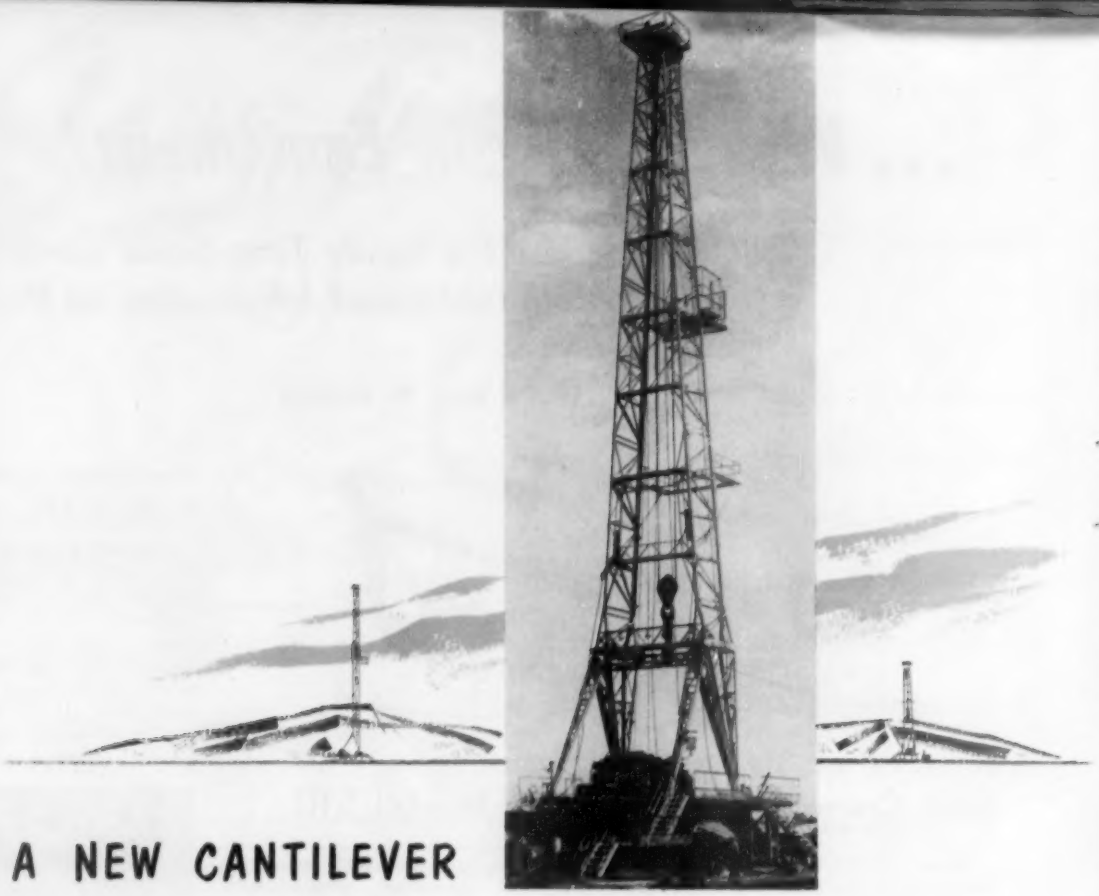
The SK Fig. 320 continuous pipeline water heater provides efficient dependable heating in a wide variety of industrial applications. Designed for direct connection to water or steam lines, the Fig. 320 heater will produce a water temperature rise up to 100° F. with water at 100 psig. and steam at 100 psig. In the heater, liquid under pressure attains a high velocity passing



through a nozzle. Steam enters through a series of slanting nozzles in the combining tube, and an intimate mixing of liquid and steam occurs in the venturi throat, where the liquid absorbs all of the heat of the steam. The hot liquid is then discharged into a tank or through a piping system.

Water flow regulation is obtained by adjustment of a nonseating screw spindle in the water nozzle. Spindle design insures correct proportions of steam and liquid. Flow rates can be duplicated through use of an indicator which shows the position of the spindle.

The pressure of the operating liquid must be at least 5 psig. while the steam pressure may be from 20-in. vacuum to 225 psig. Back pressure against which the continuous heater discharges varies with the injection water and steam pressures. Depending on what operating conditions will permit, a minimum of back pressure is preferable. Provisions can be made for starting



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What's New... Use the handy Time-Saver Cards

against back pressures higher than the inlet water pressure.

Some applications call for a greater temperature rise than 100° F. In these cases, two SK heaters may be used in series. An outstanding example of this is an installation on a Gulf Oil Corp. catalytic polymerization unit at the company's Girard Point refinery.

In this installation, as illustrated, the jet-heater system consists of one 2½-in. Fig. 320 and one 3-in. Fig. 320. Combined, they produce a temperature rise from 60° to 300° F., using 80 psig. water, and steam at 175 psig. *Schutte & Koerting Co.*

Check No. 3 On The Time-Saver Card

●

Control Electrode Made For High-Pressure Service

A newly designed high-pressure liquid-level control electrode will withstand pressures up to 4,000 psi. and temperatures up to 800° C. All metal parts of the new WCC series of electrodes are made of nonmagnetic stainless steel. Because these electrodes utilize an aluminum-oxide insulator of better than 95 per cent purity with a 200,000-psi. compressive strength, they are expected to replace mica-insulated liquid-level control electrodes now in use. These electrodes are equipped with connecting nuts for attaching probes of any desired length or shape.

The shell is designed with a ⅝-in., 24-pitch thread; and the probe is connected by means of a ¼-in., 20-pitch connecting nut. The WCC 121 also is available with a ⅝-in., 24-pitch thread, but it is fitted with a No. 10-24 pitch connecting unit. The WCC 1138 is made with a ⅜-in. dry-seal pipe-threaded shell and fitted with a ¼-in., 20-pitch connecting unit. *Auburn Spark Plug Co.*

Check No. 4 On The Time-Saver Card

●

Seismic Refraction Unit Operates at Low Frequency

The new, very-low-frequency, seismic refraction system has special amplifiers linear from 1 to 50 cycles and refraction seismometers with a natural frequency of 2 c.p.s.

With the new very-low-frequency system low frequencies are easily recorded, resulting in wider and deeper probing of subsurface conditions. High-system sensitivity also permits the use of much smaller powder charges, reducing surface damage. Well-defined first breaks have been received at 5 miles from a 5-lb. charge. The new system already is being applied to determine the thickness of sediments in large basins, to study the sedimentary column above massive Paleozoic sediments and to determine geologic structure in areas where the reflection method is inefficient. Due to its very-low-frequency response and good signal-to-noise ratio, the system is also suited to the delineation of salt domes in offshore waters.

An outstanding feature of the system is the exceptionally low-frequency response of the refraction seismometers. They have a natural frequency of 2 c.p.s. combined with high outputs of 5 volts per inch per second. With amplitude ratio of 4 to 1, two output signals from each of the 12 amplifier channels are recorded on a standard H.T.L. RS-8 recording oscillograph. *Houston Technical Laboratories.*

Check No. 5 On The Time-Saver Card

●

Redesigned Engine Offers Increased Penetration Rate

Allis-Chalmers Manufacturing Co. has redesigned its W-226 heavy-duty power unit with a resulting increase in maximum brake horsepower and performance. The new unit when operating on gasoline will develop a maximum of 60 b.hp. at 1,800 r.p.m. and 50.6 b.hp. at 1,400 r.p.m.

In addition to the choice of factory-installed gasoline, distillate or natural-gas fuel equipment that has been available for the W-226 in the past, the new power unit now also offers factory-installed L.P.G. fuel equipment.

A feature of the new unit is the heavy-duty power-takeoff flywheel housing. Standard equipment includes an electric starter mounted forward of the flywheel housing; a no-back-pressure muffler; an air-inlet pipe cover; instrument panel for either left or right-hand mounting, and a left or right-side-mounted clutch lever. *Allis-Chalmers Manufacturing Co.*

Check No. 6 On The Time-Saver Card

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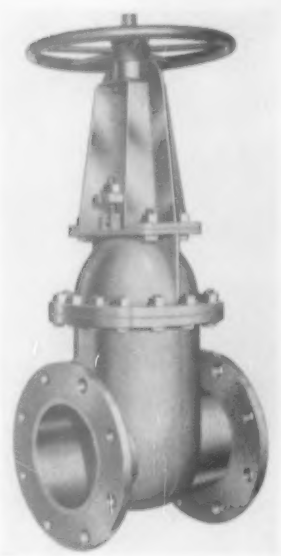


New Design Reduces Weight Of DiFab Wedge-Gate Valve

DiFab wedge-gate valve is engineered and fabricated by the latest in modern methods. This exceptionally lightweight valve is fabricated to further reduce weight and bring the general design and appearance as close to A.P.I., A.W.W.A., and A.S.M.E. standards as possible in a fabricated valve. It is available in both the outside screw-and-yoke, and nonrising-stem types in sizes 3 through 16 in. The new DiFab valve is adaptable to many difficult line applications where low cost and long, trouble-free operation is a necessity. *Fabri-Valve Co. of America.*

Check No. 7 On The Time-Saver Card

What's New... Use the handy Time-Saver Cards

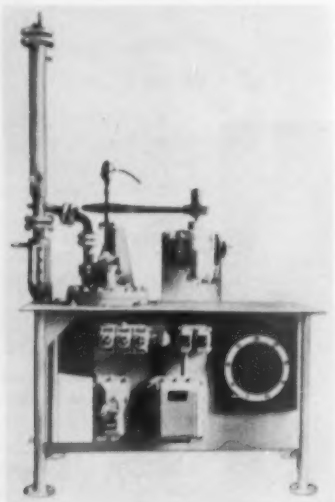
Hand Cleaner Made for Grease, Grit Removal

A new, all-purpose, antiseptic hand cleaner especially compounded to loosen and remove all sorts of ground-in grime or grease, contains antiseptic hexachlorophene to retard infections in minor cuts and scratches. Hex also contains lanolin to retard chapping and cracking of the skin, thus reducing layoffs and injury claims.

Containing no ammonia, grit, or other abrasive, Hex hand cleaner, in jelly form, is fast, gentle, and soothing. It can be used on face or hands to remove grime, and also can be used wet or dry. Applied with a dry cloth, Hex easily removes dirt and grime from wood and metal surfaces.

This new cleaner Hex is packed in convenient 14-oz. jars, 25-oz., 3-lb., and 5-lb. tins. An automatic dispenser is vailable for the 5-lb. size. *Producers Products Co.*

Check No. 8 On The Time-Saver Card



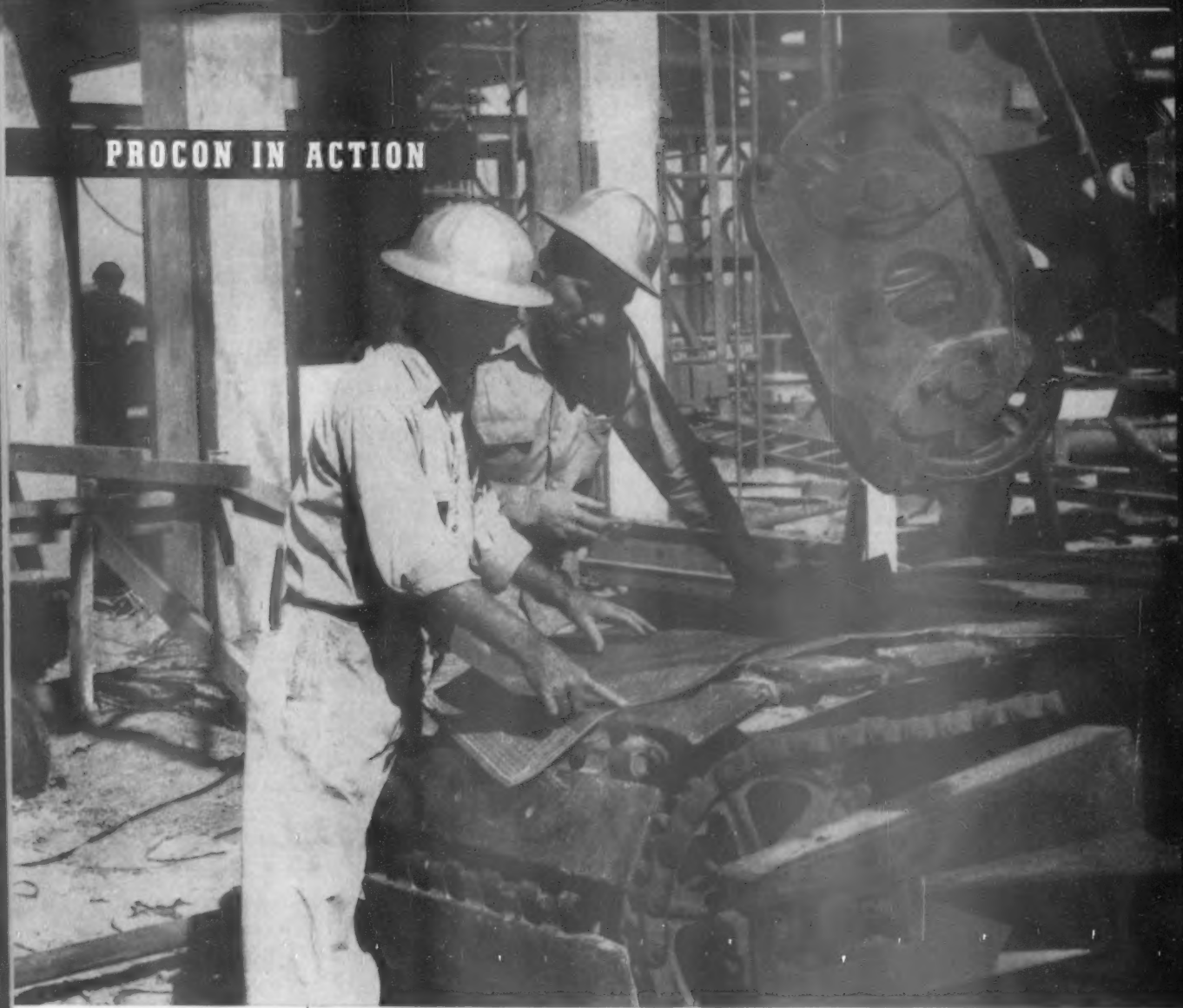
Pilot Plant Made for Process Testing

A new reaction-distillation pilot plant, Model No. 611, made up of a 5-gal. reactor, agitator, condenser, and decanter, can be used to test and study hundreds of chemical processing operations.

Gas is fed into the reactor through the hollow shaft of the agitator and enters into a reaction at the source of agitation. This eliminates the need for internal fittings. It is also used for inert gas blanketing of reactor contents.

A baffle in the condenser neck diverts the flow of condensate away from the vapor inlet into the decanter. Decanted liquid can overflow into reactor or all of condensate can be returned to reactor by closing valve. Additional connections in top head are provided to permit modified piping arrangements or installation of other auxiliary equipment.

Both endothermic and exothermic reactions, under pressure up to 150 psig., may be carried out with the unit. A cooling cylinder is permanently attached



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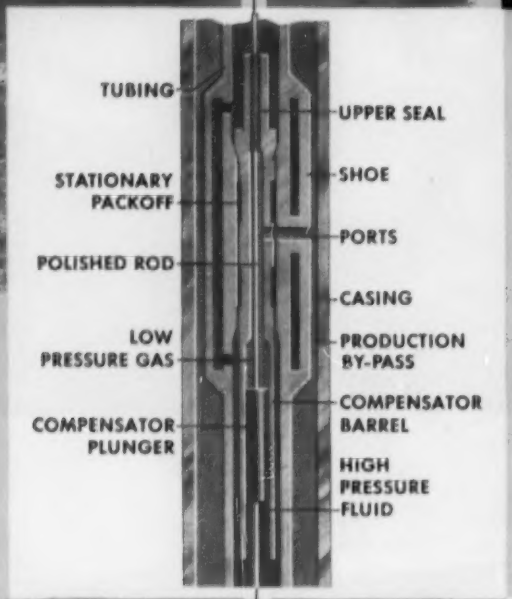
sounds mighty appealing, but like "lifting yourself by your bootstraps," it is in violation of the basic laws of science. Therefore, when we first told oil men how much weight reduction could be expected from a Rod Weight Compensator, they were skeptical and started calling the Compensator "Operation Bootstrap." That was when "Bootstrap Joe" came into being and we like to think of him as symbolic of the mighty upward thrust delivered midway down the rod string by the application of the hydrostatic pressure on the Compensator plunger.

But now the story has changed. Operators have witnessed installation after installation where the dead weight of the sucker rod string has been reduced by 33%. Now they are telling us it isn't "Operation Bootstrap" at all — that a Compensator is actually a two stage counterbalance with part of the rod load balanced out half way down the well. Others tell us we have placed an upside down pump in the middle of the rod string, and the lower pump only moves the fluid to the Compensator on the upstroke, while the Compensator boosts it to the surface on the downstroke.

We still like to believe in "Bootstrap Joe," but we don't argue. We do know that an Oilmaster Rod Weight Compensator permits more oil to be produced from greater depths than any other known means of sucker rod pumping. If deep well pumping is your problem, we suggest you get in touch with your Oilmaster Representative for further details on the...



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What's New... Use the handy Time-Saver Cards

to the inner walls of the reactor. Three 2,000-watt, thermostatically controlled, tubular strip heaters are clamped to the outside of the reactor. Either 120 or 230-volt heating units may be specified. All controls are furnished for Class I, Group D locations.

The reactor is equipped with a 1-in. flush-bottom valve with Teflon seat, and 3-in. quick-opening charge-connection port. Surfaces in contact with reacting materials are of stainless steel. *Patterson-Kelley Co.*

Check No. 9 On The Time-Saver Card

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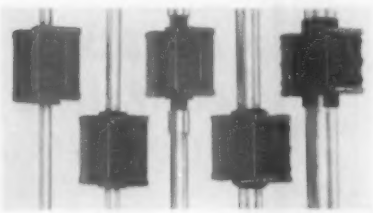

Visibility Improved In Sight-Flow Indicators

A new and complete line of top quality, dependable sight-flow indicators, for viewing liquid flow, can easily and inexpensively be installed in any new or existing pipeline ½ to 2-in. N.P.T.

Sight-flow indicators are available in transparent two-window and one-window and Reflex one-window types. Visibility of liquid flow is improved by obtaining turbulence through the interrupted bore of the fitting. Several types of indicating vanes may also be furnished, according to variable conditions of rate of flow and viscosity of liquid. These are installed within the chamber and show the flow or absence of flow by movement when liquid is flowing. The Reflex type flow indicator is used where the main objective is to show only whether or not there is liquid in the line. When liquid is flowing, the glass will show black, due to the prismatic window; when the line is empty the glass will show a silver-white color.

Solid wedge-type illuminators, which give an even diffusion of light over the entire area of the glass, are available for use with these flow indicators. In addition to the standard carbon-steel construction, sight-flow indicators are available in a wide variety of special stainless steels and other metals, as well as with linings of lead, phenol, and rubber. *Jerguson Gage & Valve Co.*

Check No. 10 On The Time-Saver Card

Spray Coating Combines Protection, Insulation

A new spray coating for metal equipment combines protection from corrosion with a moderate degree of insulation. Black in color, this new product is made of processed coal-tar pitch mineral filler, solvent, and granulated cork. Requiring no primer, one application of this coating produces a protective covering up to ½ in. in thickness.

This new cork mastic was developed for use in locations where metal tanks containing heated materials require corrosion protection as well as insulation to prevent major heat losses. It may be used where massive insulation, installed at much greater cost, is not required.

Such combined protection is best suited for oil storage tanks, asphalt storage tanks, any metal tank whose contents are kept at temperatures up to 150° F., chemical plants or equipment, corrugated steel sidings, and heating and ventilating ducts. *Koppers Co.*

Check No. 11 On The Time-Saver Card

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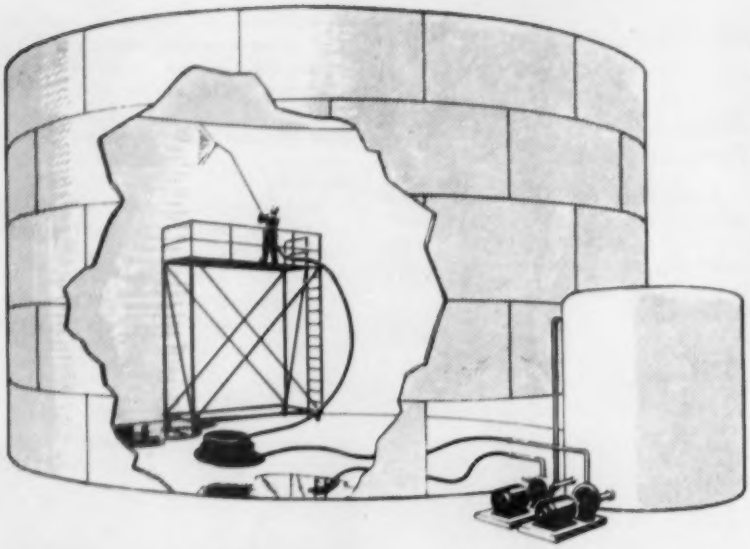

How a refinery cut storage tank cleaning costs by MORE than 75%

PROBLEM: Find a low cost method of cleaning an 80,000 gallon petroleum storage tank. Previous manual cleaning method was slow, wasteful, making costs extremely high.

SOLUTION: Utilizing standard equipment such as solution tank, pump, hose, piping and scaffolding (constructed from scrap) they set up a spray method using recommended Oakite solvent detergents. Entire installation constructed from working drawing supplied by Oakite Technical Service Representative.

RESULTS: By eliminating scrubbing, brushing and other manual cleaning methods, entire inside surface of storage tank was cleaned in only 12 hours. *And at 1/4 of their former costs.*

SEE PAGE 19 of the information-packed handbook, "What Petroleum Men Should Know to Simplify Cleaning," for complete details of cleaning and paint stripping storage tanks. This guide is loaded with facts that can help petroleum men realize greater savings in time and money on many maintenance cleaning operations. It's FREE on request. Write Oakite Products, Inc., 44C Rector Street, New York 6, N. Y.

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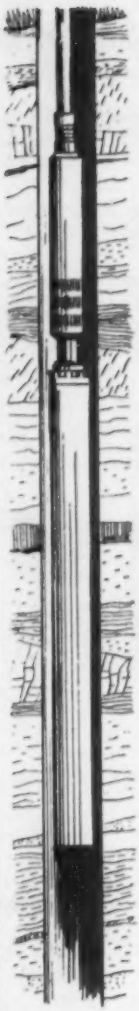

THE BEST WAY TO *LOWER* OPERATING COSTS.... *LOWER* A REDA PUMP INTO YOUR WELL

With continually rising labor and investment costs, economy of operation is of paramount importance in producing wells with decreasing oil-water ratios.

Reda pumps are given consideration as original or replacement equipment because of their known performance in producing fluid at a *lower* cost per barrel, thus often extending the ultimate economic life of wells.

Improved engineering and design have increased operating life. Increased operating life means *lower* labor cost per barrel, *lower* investment cost per barrel, *lower* maintenance cost per barrel: *lower cost per barrel produced.*

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for your copy, check ✓ ✓ the Time-Saver Cards.

2000-MC Microwave. A complete description of 2,000-mc. microwave radio systems for a variety of applications is given in a new eight-page booklet, B-6393. Features of Type-FR microwave radio and Type-FJ multiplexing equipment and their importance to the over-all system is discussed. Points covered include frequency division multiplexing, crystal frequency control, standby equipment, maintenance features, and many others. *Westinghouse Electric Corp.*

Check No. 12 On The Time-Saver Card

Pipe Fabricating, Bending, Heat Treating, a four-page brochure lists the facilities, experience, and scope of a new, West Coast pipe-fabricating firm. The folder features pictures of heat-treating, pipe-bending, and welding equipment. *Herrick-Bradley Engineering.*

Check No. 13 On The Time-Saver Card

Nonportable Compressors—and Installation and Maintenance Guide. Among the topics covered in this reprint No. RP-725, an article by H. W. Whiting of Worthington Corp., are: location; foundation-shaking forces; soil considerations; foundation suggestions; piping; location of after and intercoolers and receivers; temperatures; lubrication, inspection, and maintenance information. *Worthington Corp.*

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Power Operators. Bulletin B-50-2, a 12-page booklet, describes the cylinder Conomotor, pneumatically positioned power operator for throttling control service. This bulletin illustrates the versatility of the cylinder Conomotor and its many applications including proportional control of speed changers, valves, pumps, and electrical components. *Conoflow Corp.*

Check No. 15 On The Time-Saver Card

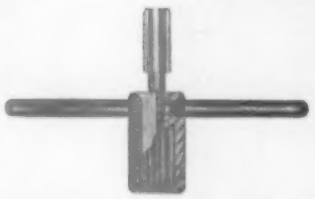
Condensing and Noncondensing Applications for Turbine Generators. Turbine generators rated from 2,500 to

SLUSH PUMPS

Cleanout

TAP *and* DIES

by Baird



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40,000 kw., are described in a new, 54-page booklet designated GEA-3277C. Condensing and noncondensing applications for industrial plants as well as special turbine applications are covered in detail in the new publication. Cross-sections, schematic drawings, and numerous close-up and installation photographs describe applications and features of straight condensing and noncondensing steam turbines. Also detailed are condensing and noncondensing single and double-automatic-extraction, condensing double-flow-exhaust, and triple-auotomatic-extraction units. *General Electric Co.*

Check No. 16 On The Time-Saver Card

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Aeroflotor. The bulletin discusses the principles behind the design of this new flotation unit, its operation, and its special features. The Aeroflotor has particular application in the oil industry. *Graver Water Conditioning Co.*

Check No. 17 On The Time-Saver Card

●

New O-Ring Catalog. Catalog AD-148 gives complete design information, recommended pressures, and available materials for both dynamic and static applications. It also contains a complete list of standard O-ring sizes. *Garlock Packing Co.*

Check No. 18 On The Time-Saver Card

●

Lister Marine Diesel Engines with one to six cylinders and 9 to 54 b.hp. at 1,800 r.p.m. are presented in a four-page illustrated Bulletin No. 448. Design features, accessories, performance cruves, and dimensional diagrams are included. *National Supply Co.*

Check No. 19 On The Time-Saver Card

●

Hydraulic Cellar Control Gates. An informative 36-page service manual, Bulletin HCG, covers installation, maintenance, and servicing of hydraulic cellar control gates, hydraulic power units, and hydraulic control panels. This manual, completely illustrated with cutaway views, exploded parts illustrations, and hook-up diagrams, is a valuable addition to the files of any drilling or production company using hydraulically operated control-gate equipment. *Shaffer Tool Works.*

Check No. 20 On The Time-Saver Card

●

Diesel Engines. Bulletin No. S-500-B42B presents information on construction details, applications, and latest design features. A three-page schematic diagram illustrates the various com-

ponent parts in addition to specifications. Fuel costs per gallon are shown on separate charts for oil, natural gas, and propane along with a horsepower ratings chart for five, six, and eight-cylinder engines. *Worthington Corp.*

Check No. 21 On The Time-Saver Card

●

New Caterpillar Twin Arc Welder. This four-page booklet, Form 31408, illustrates the new unit with on-the-job photographs, depicts two welding generators, powered by a single D315 engine, mounted in a single-generator frame. Each of the two generators has an output of 300 amp. but can be paralleled to produce 600 amp. Units can be easily mounted on a truck bed which makes for improved mobility in transporting as well as on the welding job itself. *Caterpillar Tractor Co.*

Check No. 22 On The Time-Saver Card

●

Centrifugal Pumps. A new 12-page Bulletin 722.6 on Fig. 3305 two-stage centrifugal pumps with horizontally split case and opposed impellers gives detailed information on specifications, materials of construction, and mechanical details. It includes performance curves, and charts showing parts interchangeability. *Goulds Pumps, Inc.*

Check No. 23 On The Time-Saver Card

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Bulletin SI-101 describes packaged units, including fan, motor, motor base, and adjustable-speed V-belt drives. These units eliminate need for tall, expensive stacks since constant boiler draft can be maintained regardless of weather conditions, stack height, or placement. The fan will support 30 ft. of 1/8-in. gage-steel stack properly braced with guy wires. Spid fans are available for oil or gas-fired boilers in all sizes up to 350 hp. and 650° F. *Chicago Blower Corp.*

Check No. 24 On The Time-Saver Card

●

Digital Converter. A complete line of Digi-Coder digital converters, electromechanical shaft-position types and voltage types, are described in a 12-page Catalog 58-10. The first type mechanically converts shaft position into discreet electrical contact combinations for a digital code, permitting automatic logging or input to computers for industrial operations. The second type converts voltages to digits for spans of 0 to 1 mv. and up. Various models of both types are described for dynamic readout, linear or nonlinear conversion, and direct reading ranges. *Fischer & Porter Co.*

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Check for Yourself the Outstanding Advantages of G-B Pipe Coupling Products

ROLAGRIP

Couplings for plain end pipe, 1½" to 12", 1000 p.s.i.

GRUVAGRIP

Heavy duty couplings for grooved pipe, ¾" to 14", 1000 p.s.i.

GRUVAJOINT

Lightweight couplings for grooved pipe, 2" to 6", 500 p.s.i.

Can Be Installed More Quickly

No special tools or skill required. With G-B pipe couplings, flanging, threading and welding are eliminated.

Are More Economical to Use

All G-B couplings are reusable. Every joint is a union, making the job of taking a line apart for cleaning a simple task.

Are More Flexible

Rolagrip and Gruvagrip permit misalignment up to 7°, Gruvajoint up to 5°. All absorb shock, vibration, ground motion, expansion and contraction.

Are Highly Versatile

Air, gases, water, oil, chemicals, processing fluids, pulverized minerals and rock . . . G-B couplings built for use with pipe carrying all of these.

Are Completely Dependable

All are built of rugged malleable iron painted inside and out with rust inhibitor. All stand temperatures from –65° to 225° F.

Precision Fittings

For use with Gruvagrip and Gruvajoint couplings, G-B offers a companion line of free-flowing, 100% reclaimable fittings; also hand and power Pipe Groovers for pipe up to 12".

Write Today for illustrated brochure 55-C. Contains specifications on G-B's complete line of coupling products, which includes aluminum couplings and fittings for grooved pipe in addition to all items shown here.

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EQUIPMENT MEN . . . in the News

Kenneth Davis, Jr., Named President of Unit Rig

K. DAVIS

Kenneth Davis, Jr., has been elected a director and named president of Unit Rig & Equipment Co., Tulsa, by the organization's board of directors.

Davis replaces former President Paul Courtney, whose resignation was recently accepted by the board. Courtney will become associated with Westinghouse Air Brake Co.

Unit Rig & Equipment has headquarters, manufacturing, and warehouse facilities in Tulsa. The company makes rotary drilling rigs, engine compounds, rotary tables, servicing hoists, traveling blocks, pump drives, and rathole diggers.

Davis was formerly associated with Loffland Brothers Co., Tulsa, as vice president in charge of exploration. Prior to that he was executive vice president of Great Western Drilling Co. and Great Western Producers, Inc., both with headquarters in Midland, Tex. Immediately after finishing college, Davis worked for Mid-Continent Supply Co. in the Fort Worth general office and the company's field store in Snyder, Tex.

H & L Tooth Co. Announces Winners in Guessing Game

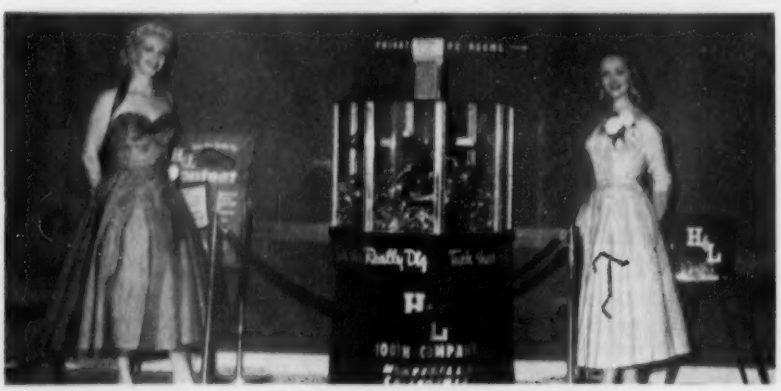
H & L Tooth Co. has announced the winners of a guessing contest held by the company at the recent Pipe Line Contractors Association convention in Los Angeles. Winner in the men's division for pipeline members and key employes was John G. Hahn, Omaha, Neb., Pentzieh, Inc., and in the associate members group by John C. Klinger, Houston, pipeliner. In the ladies' division, there was a tie, necessitating a drawing between the two ladies. A second watch, identical to the first, with the exception of the size of the diamonds, was awarded to the loser in the drawing. Winners in the ladies' division were Mrs. James P. Neill, Dallas, and Mrs. Jack Hodges, Houston, both of whom are with Western Pipeline Constructors, Inc.

The judging committee in the contest was composed of one officer of the association, an official of H & L Tooth Co., with a certified public accountant to tabulate the ballots. The awards were made by E. L. Launder, H & L president.

Schlumberger Opens New Store at Sterling, Colo.

Schlumberger Well Surveying Corp. has opened a new office and service point in Sterling to serve oil producers in the Denver-Julesburg basin. With the opening of the new location Schlumberger services will be available to the oil industry through more than 130 field locations in the United States and Canada.

The Sterling location will be equipped to offer all Schlumberger services now in use in the Rocky Mountain area. H. F. Soerensen will be in charge of the new location. He was formerly stationed at Farmington, N. M. M. D. Kline, engineer, has been transferred from Sidney, Neb., to assist in carrying out field operations.



Various sizes of H & L teeth were displayed in this cabinet and awards were made to delegates guessing closest to the number of teeth on display.

Courtney Named President Of George E. Failing Co.

P. COURTNEY

Paul Courtney, Tulsa, has been named president and director of George E. Failing Co., Enid, Okla., manufacturers and suppliers of portable drilling rigs and equipment for the oil, construction, water-well, and mining industries, according to an announcement by Edward O. Boshell, president and chairman of the board of Westinghouse Air Brake Co., Pittsburgh, the parent company for Failing.

Courtney will assume his duties on March 1, succeeding R. R. Morgan, general manager of the Cleveland Rock Drill Division of Westinghouse, who has been serving temporarily as president of Failing Co.

The new president of Failing recently resigned as president of Unit Rig & Equipment Co., Tulsa. He has been associated with the oil industry for many years and spent considerable time in foreign operations with Shell Oil Co. He joined Emsco Manufacturing Co. in 1938, later became plant manager of the Emsco plant in Houston and was elected vice president in 1950. He retained this position until 1953, when he joined Unit Rig as president and director.

Failing Co., which is a wholly owned subsidiary of Westinghouse Air Brake Co., has branches in Houston; Los Angeles; Midland, Tex.; Hattiesburg, Miss.; Casper, Wyo.; and Edmonton, Alta., Canada. The export office is located in New York City, and the company has agents or representatives in nearly every oil-producing country outside the Iron Curtain.

Pennsalt Names McCullough Assistant Sales Manager

McCULLOUGH

Appointment of James M. McCullough to the new position of assistant sales manager, Heavy Chemicals Division, has been announced by L. M. Shanaman, Heavy Chemicals sales manager for

●By charter amendment, Feb. 15, 1955, the name of Toklan Royalty Corporation was changed to

TOKLAN OIL Corporation

General offices at 633-646 Kennedy Bldg., Tulsa, Okla. Personnel remains unchanged. Title now rests in Toklan Oil Corporation to all properties formerly owned by

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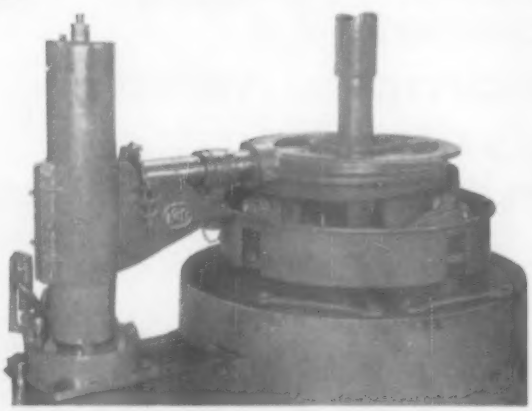

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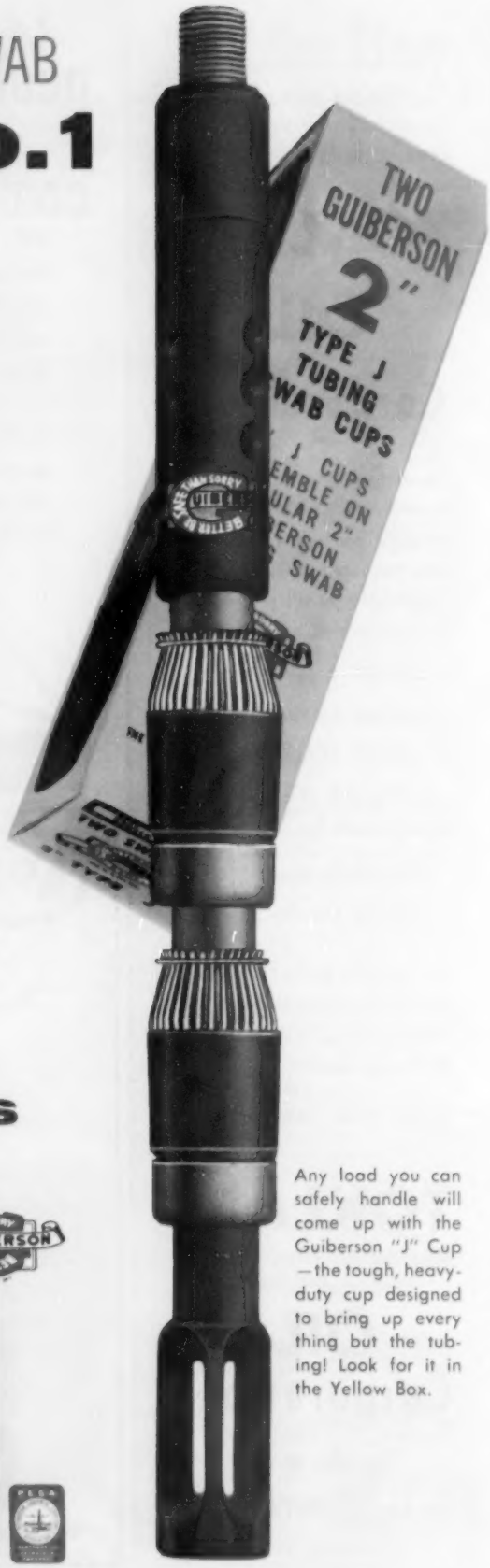

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McCullough joined Pennsalt at Tacoma, Wash., in 1943 as purchasing agent and personnel manager. In 1952 McCullough transferred his office to Portland, where he assumed responsibilities for all purchasing activities and export sales for Pennsalt, which manufactures and supplies industrial chemicals to the 11 western states and agricultural chemicals on a national scale.

Parkersburg-Aetna Opens Fort Worth Headquarters

A. S. KNOWLES

Parkersburg Rig & Reel Co., division of Parkersburg-Aetna Corp., has established a new executive office in Fort Worth, Tex. The new headquarters was officially opened on January 26th when the firm held open house for its associates in the petroleum industry.

The new offices, recently transferred to Fort Worth from Parkersburg, W. Va., have been designed for utmost efficiency in directing and handling the division's business with the oil industry throughout the world.

W. A. WOOD

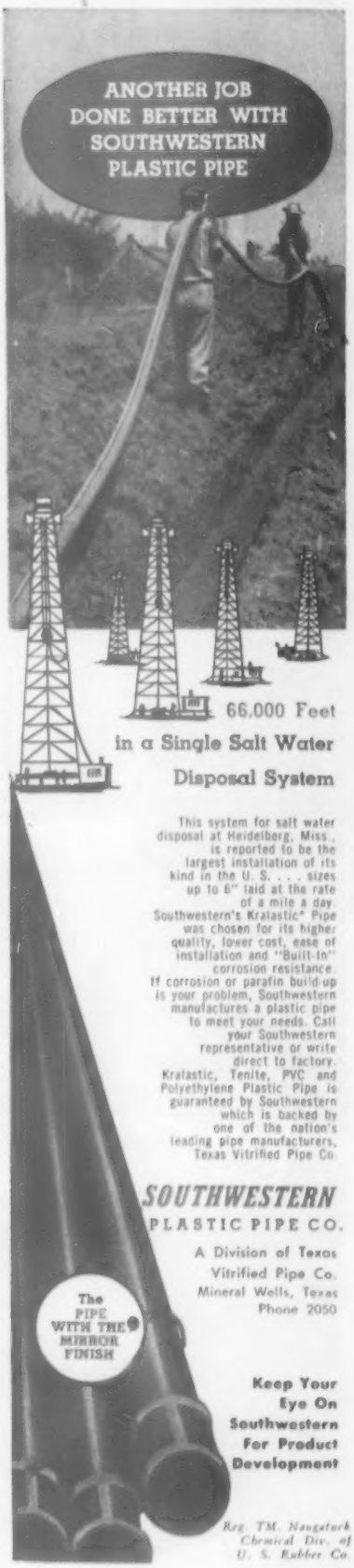
W. V. RATHBONE

In addition to being executive sales headquarters for the division, the Fort Worth offices will handle all tabulating, billing, and accounts receivable, accounts payable, and statistics; inventory control and traffic; inquiry quotations and order processing.

EVANS-LOMBE

BRUMMAGE

Officers of Parkersburg-Aetna Corp. are: A. Sidney Knowles, chairman of the board; William A. Wood, president; W. V. Rathbone, executive vice president of Parkersburg Rig & Reel Divi-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sion; J. J. Rozner, executive vice president of Aetna Ball & Roller Bearing Division; A. G. Evans-Lombe, vice president and general sales manager; Paul O. Summers, vice president and secretary; R. L. Brummage, comptroller; Edward A. Johnson, treasurer and assistant secretary; and Harold N. Wilson, assistant secretary and assistant treasurer.

Directors are A. D. Chilgren, Chicago; Knowles; H. F. Lehmpuhl, Chicago; Arnold Smith, Charlottesville, Va.; Summers; Richard Wagner, Chicago; J. N. Whipple, Chicago; Wood; and E. K. Zitzewitz, Chicago.

Parkersburg manufactures more than 50 different types of equipment for all phases of the oil and gas industry.

Bethlehem Opens New Store at Sweetwater

Bethlehem Supply Co. officially opened a new store at Sweetwater, Tex., on February 1. The store will maintain a sufficient stock of drilling and production materials and supplies as required by the increasing oil-field activities in Nolan County.

Harry Dodds, field representative, will cover the oil-field sales in the area and Vernon Stevens will be chief clerk in the store. The new store will be under the immediate supervision of C. W. Nichols, store manager at Abilene, Tex., and under the general supervision of W. E. Stephenson, district manager at Wichita Falls, Tex.

Dowell Announces Engineering Promotions

G. N. THRESHER

G. N. Thresher, chief engineer, has been promoted to chief engineer, equipment, operations, and maintenance; L. S. Aurand, project engineer, has been made chief construction engineer; and E. J. Echols, development engineer, has been named chief design engineer, according to an announcement by W. J. Russell, manager of equipment and supplies, Dowell Incorporated, Tulsa.

L. S. AURAND

E. J. ECHOLS

Thresher will be responsible for all field operations and maintenance of equipment, radio communications, equipment records, manuals, and bulletins.

The construction engineering department under Aurand will handle design and construction of all station facilities and buildings throughout Dowell.

Design of all equipment used by Dowell in its various services will be managed by the design engineering department under Echols. This includes research of service-equipment design, layouts, sketches, detailed drawings, and bills of material.

Dowell operates from more than 160 sales and service locations in 31 states, Canada, and Venezuela.

Baylor to Make and Sell Eaton Brakes and Couplings

Baylor Co., Inc., has been licensed by Eaton Manufacturing Co., Cleveland, to manufacture and sell electromagnetic couplings and brakes for oil-field drilling equipment. These devices were formerly manufactured by Dynamatic Division of Eaton at Kenosha, Wis., and were known as Dynamatic

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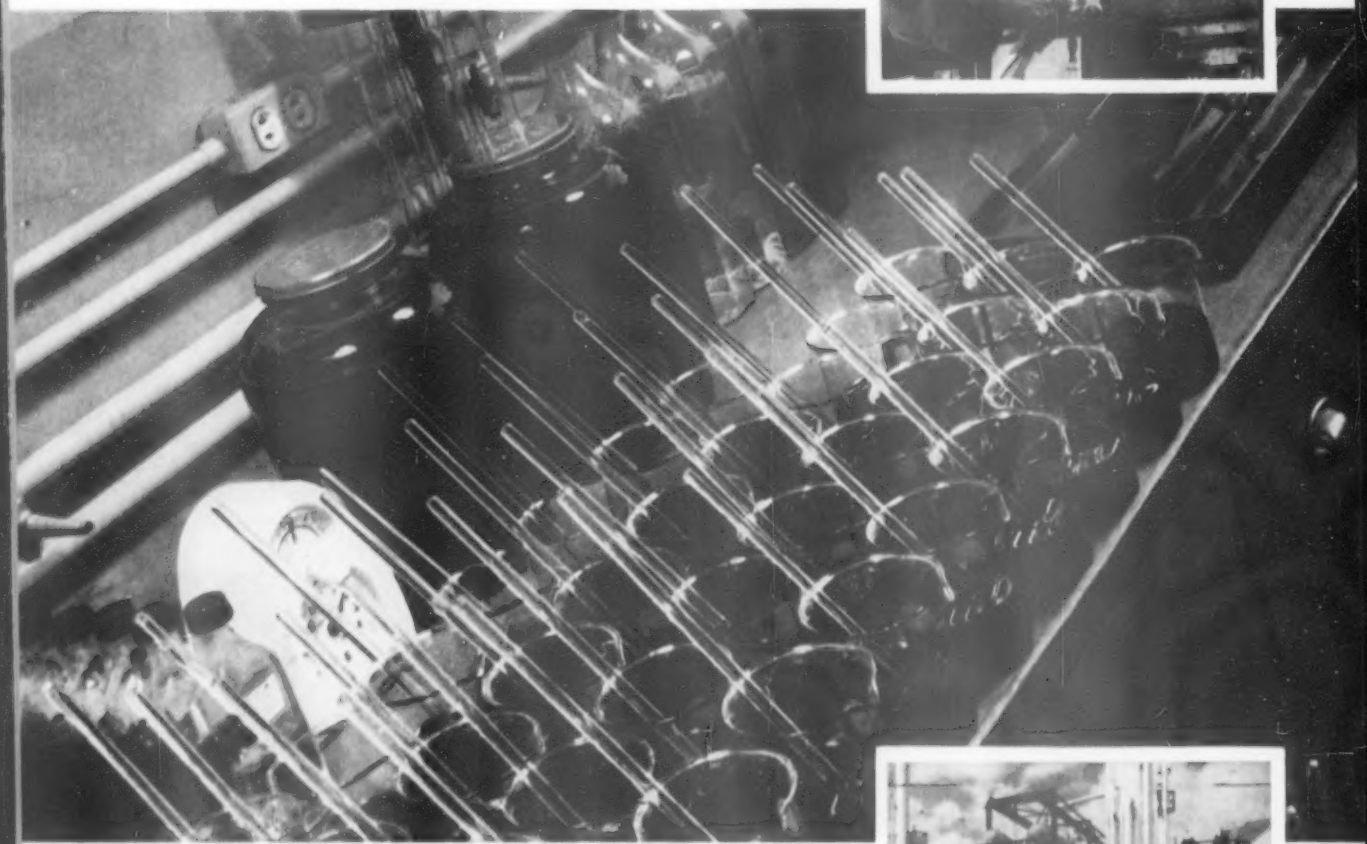

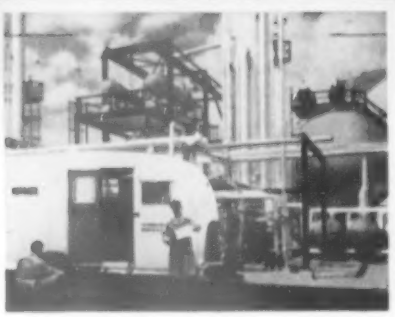

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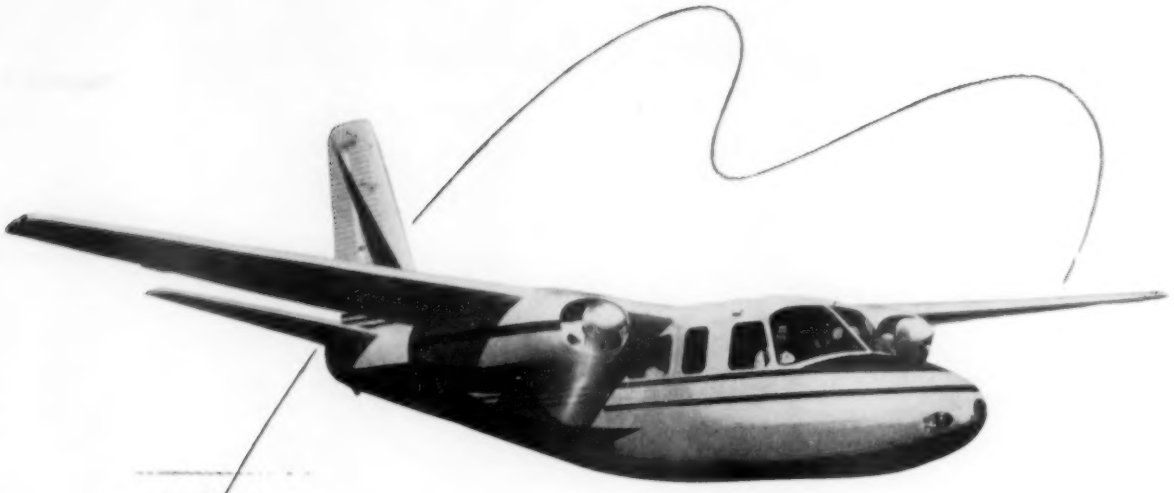

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couplings and Dynamatic brakes. Henceforth they will be manufactured at Houston under the trade-mark of Elmagco couplings and Elmagco brakes. Sales and service arrangements remain unchanged.

Reed Is District Engineer For Oilwell's Houston Area

W. L. REED

Appointment of Wallace L. Reed as district engineer at Houston for U. S. Steel's Oil Well Supply Division has been announced by M. F. Jones, manager of Oilwell's Gulf Coast area. Reed transfers to Houston from New Orleans, where he has held a similar post since 1951. He joined Oilwell in 1949 as an engineer trainee at Alice, Tex. After his training there he was named assistant district engineer at Thibodaux, La. He transferred to New Orleans in 1950.

LeBlanc Made President, Gulf Coast Machine, Supply

Clifford H. LeBlanc has been named president of Gulf Coast Machine & Supply Co., manufacturers of forged-steel oilfield equipment, in Beaumont, Tex.

A graduate engineer, LeBlanc joined the company in 1933 and, during the past 4 years, has served as executive vice president and general manager.

Beginning in 1950, Gulfco has engaged in a program of expansion and, besides its export division, now maintains sales and service organizations in 11 states.

Noise Seminar Conducted For Pipeline Engineers

A special noise seminar was conducted at the Petroleum Club in Shreveport, La., on February 4, attended by representatives of the gas-pipeline companies. George Steven, executive engineer of Worthington Corp.'s Buffalo Works, introduced Norman L. Meyerson, assistant manager of research and development at the corporation's Harrison, N. J., works.

Meyerson covered the subject of noise measurement and evaluation, illustrating his talk with photographs depicting treatment of equipment and buildings, and also sound recordings of before and after treatment.

Romberg, Geyer Named to New Posts by G.S.I.

The appointment of Frederick E. Romberg as manager of Gravity Division of Geophysical Service, Inc., Dallas, has been announced by G.S.I. Executive Vice President F. J. Agnich.

Dr. Richard A. Geyer has also joined the staff of the G.S.I. Gravity Division as chief geophysicist. Prior to joining the division, Dr. Geyer had served as research geophysicist for Humble Oil & Refining Co. since 1945.

Romberg was formerly manager of the Dallas based firm's southern division in Houston. He will maintain headquarters at the Gravity Division's new office at Houston.

F. E. ROMBERG

R. A. GEYER

Ray H. Wright replaces Romberg as manager of the southern division.

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EXPLORATION

1955 in Kansas . . . Deep and Rank

by John C. McCaslin

WITH one of the most significant exploratory years in history behind it the Sunflower State has entered an important oil-finding period. Deep and remote wildcatting in 1954 netted an impressive list of successful discoveries in Kansas . . . most of them in the vast western area of the Hugoton embayment. After several years of scattered interest in western counties, last year's intensified search rolled right into 1955, getting hotter with each passing week.

The Arbuckle surprise . . . The state's biggest exploratory find last year was the first Arbuckle production for the western region.

This Arbuckle strike was credited to W. L. Hartman's 1 Rush, 76 miles west of previous Arbuckle production. It was put on the pump for 153 bbl. of oil per day to give Scott County a real boost. Few wildcats had ever gone to the Arbuckle before in the 25,000-sq. mile region of the Hugoton embayment. Most previous tests in western Kansas were aimed for the Mississippian. The significant Arbuckle hit opens a vast new possible reservoir for the area. The formation blankets the entire area west of the Central Kansas uplift. Even the Mississippian rocks in the area have been sparsely tested. An active exploration program is slated for these objectives in rank western areas this year. Kansas operators will stress full-column drilling in the counties north of Hugoton field.

Producing list to grow . . . All predictions point to new producing counties for Kansas this year, particularly in the areas surrounding the northwest side of Hugoton field.

Hamilton County is the newest oil area to be added to the state's production list. United Producing Co. took this county off the dry list early this year and made it the seventy-third oil producer in Kansas with successful Pennsylvanian oil production at 1 Helfrich, 12 miles southwest of Syracuse. The Cherokee sand oil discovery is about as rank as a test can get . . . 56 miles north of Interstate-Morrow oil field in Morton County, and 20 miles northwest of Hugoton field gas production. It seems highly probable that other new counties will see oil or gas production established this year.

Exploratory drilling in western Kansas in 1955 will concentrate on the deep pre-Permian formations of the Hugoton embayment.

Deep pay search . . . Three deep-zone discoveries inside Hugoton field last year gave the go-ahead for increased deep drilling of the pre-Permian variety in 1955.

None of the 1954 discoveries inside Hugoton field were prolific, but they indicate the tremendous potentialities of the Pennsylvanian and Mississippian rocks under this big area. Here again few tests have ever gone that deep . . . this will all be changed in 1955.

Prolific trio . . . Three counties lying just north of the Oklahoma Panhandle have outrun all others in western Kansas in the past 3 years. They are Seward, Meade, and Clark.

The pre-Permian rocks have been the prime targets in this successful wildcat program. One of the best new fields in the area is Harper's Ranch in Clark County. Morrow sand oil production moved north, northwest, and northeast from the discovery well in 1954 with the field's limits still undefined. Gas production was added to the prolific oil-producing area last year at a 2-mile north extension. This new area was designated North Harper's Ranch field.

Morton's success . . . One of the biggest success tales in western Kansas in the past 3 years has been the rapid growth of the Greenwood Topeka-Lansing gas field in the far southwestern corner of the state.

In 1954 oil production was added to this Morton County field, opening Interstate field. The discovery well pumped 252 bbl. of oil per day. Several wells are on production in the field with no producing limits defined. Greenwood field itself was nearly doubled in size last year. A number of wells on the north and west sides of the big field indicated production from previously untested lime pays with production assured from the Wabaunsee at one. The search for new pays will pick up this year in the field.

Far-flung success . . . Widely scattered wildcat drilling in 1954 brought success to other western Kansas areas.

Out in Stanton County on the western flanks of Hugoton field, J. M. Huber Corp. established Morrow sand gas production at 1 Sparks, opening Sparks field. This important strike flowed 15,600 M.c.f. of gas per day. The strike opened first Pennsylvanian production in the county. This area can expect further 1955 development.

On the eastern side of the Hugoton embayment province Ness and Ford counties came in for a share of the 1954 success. Barnett Oil Co. 1 Shearer pumped 66 bbl. of oil per day from the Mississippian to open Northeast Aldrich field. This field had five wells on production at the beginning of 1955. Very little drilling has been done in this area of Kansas. Ford County, a comparatively new producing area, received a Mississippian gas discovery at W. J. Coppinger 1 Vice.

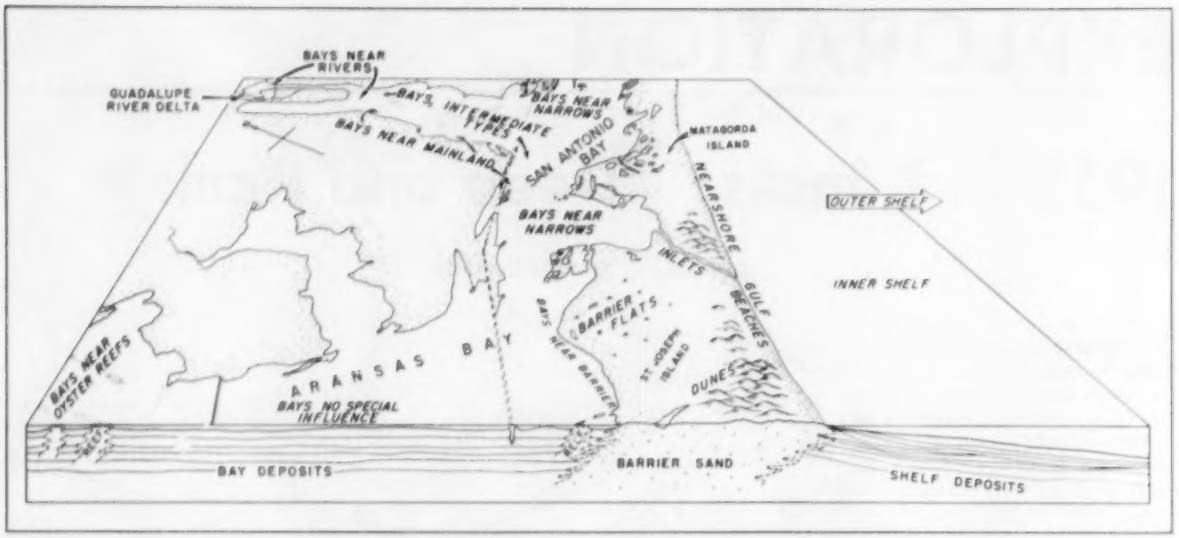

Fig. 1—Block diagram showing the depositional environments of the area near Rockport, Tex.

This report on a current A.P.I. project outlines . . .

Stratigraphic Research That May Pay Off

by Francis P. Shepard

PROJECT 51 of the American Petroleum Institute has involved a study of the sedimentation conditions along the northern coast of the Gulf of Mexico. In initiating this work, operations were conducted along a central portion of the barrier island and embayed Texas coast, choosing the Rockport-Aransas Pass area where a minimum amount of industrial pollution has affected the bays.

Author is with Scripps Institution of Oceanography, University of California, La Jolla. Contribution from the Institution's New Series No. 752. This investigation was supported by a grant from the American Petroleum Institute, Project 51.

The area includes San Antonio, Mesquite, and Aransas bays, along with St. Joseph and Matagorda Islands and the bordering Continental Shelf. A large part of the project has been devoted to making a detailed study of this area during the past 3½ years.

Most of the thousands of samples obtained in this work have now been quite completely studied. And they have been supplemented by a series of borings along the length of San Antonio Bay and out on the barrier islands. So we have more than a two-dimensional picture of the environment of deposition—a third dimension has been added so that the sediment units can be more clearly defined.

The study of these sediments has been somewhat unique since it has included a joint effort by sedimentationists, biologists (including students of macroorganisms, foraminifera, ostracods, microfossils, and bacteria), clay mineralogists, chemists, and—to a limited extent—petrographers and physical oceanographers.

This has been possible because of the wide diversity of oceanographic studies in progress at Scripps Institution and also because of the cooperation of several other universities in the project.

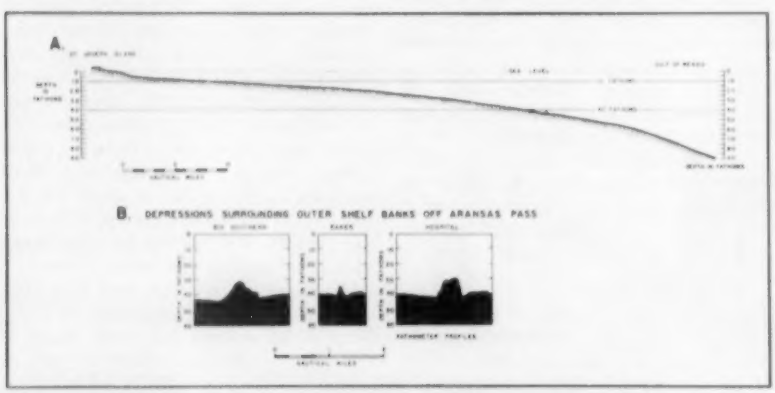

Fig. 2—The general profile of the Continental Shelf and the small banks which rise near the 40-fathom curve. The rise shown on the profile is much smaller than the banks.

Geographic setting . . . The Rockport-Aransas Pass area of intense work is illustrated by the block diagram in Fig. 1.

The bays of the area are shallow. San Antonio Bay to the northeast has depths of only about 6 ft. at a maximum. Mesquite Bay has depths of only 4 ft. But Aransas Bay reaches depths of as much as 13 ft.

The combined drainage of the Guadalupe and San Antonio rivers enters at the head of San Antonio Bay and has resulted in the building of Guadalupe Delta. Smaller streams come indirectly into Copano Bay. Aransas and Mesquite bays, on the other hand, receive no drainage of any significance. So their sediments must have come

largely as transfer from other bays or from material carried over from the barrier islands by flood, blown in by wind, or carried in through the inlets which connect both of these bays with the gulf.

The barrier islands are very wide in this area, possibly the widest of any place in the world. They reach a maximum width of somewhat over 5 miles. The broad beaches on the gulf side are bordered by lines of dunes and so-called beach ridges. On the bay side of the barrier islands, there are extensive flats, some of which are cut by channels and lakes. Many of these lakes are circular.

These low inner borders may be referred to as "barrier flats." Some of them are apparently overwashes from the gulf side. Others are of less certain origin. The Continental Shelf extends out for 50 miles beyond the coast, ending at depths of 50 to 60 fathoms. The inner portion of the shelf has comparatively steep slopes down to about 5 fathoms. Then it slopes very gently out to 20 fathoms, beyond which there is a slight steepening. In general, the Continental Shelf is quite even, although it has very slight irregularities and some hills rise abruptly from the outer part of the shelf near the 40-fathom line (Fig. 2).

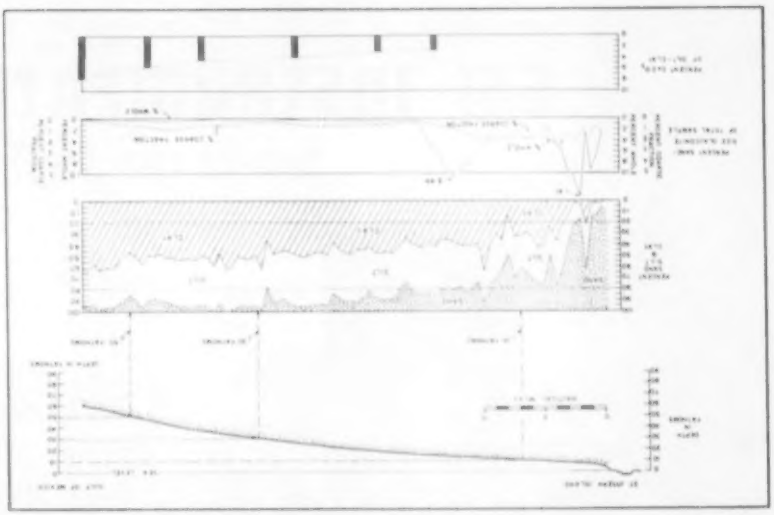

Fig. 4—Variation of sediments in a line crossing the Continental Shelf off the Rockport, Tex., area.

Bay sedimentary environments . . . In the shallow bays of the area, there appear to be a number of very distinctive influences which serve to differentiate the sediments. Thus, we have the influence of the Guadalupe River at the head of San Antonio Bay which brings into the bay a considerable quantity of plant or wood fibers along with ferruginous aggregates which are mixed with the other sediments. The fresh water introduced by the river results in a high production of ostracods so that they actually exceed the foraminifera in abundance in many samples of this environment.

Clay makes up a very high percentage of the deposits in the bay near the river mouths and also on the Guadalupe Delta. This clay is unusually high in calcium carbonate, introduced as particulate material. It presumably comes from the Austin chalk and from various Lower Cretaceous and Paleozoic formations.

Lower down in the bays, the plant materials become scarce and the ostracods are greatly exceeded by the foraminifera in the coarse fraction (greater than ⅛ mm.). The clay content remains high, considerably exceeding the silt, and the sand content is low. Locally in these intermediate portions of the bays, oyster reefs are present with a resulting high shell content. Some of this shell material is transported away from the reefs and thus influences the sediment in the vicinity.

The southeastern side of San Antonio Bay, all of Mesquite Bay, and the southwestern side of Aransas Bay—all show the influence of nearby inlets or narrows. The effect of these constricted zones is to develop currents capable of transporting sand. Thus the sand becomes more abundant in these areas than clay. Silt, on the other hand, remains relatively low so that the typical sediments of "bays near narrows" are clayey-sands.

The deeper part of Aransas Bay—where the influence of the river is very indirect, where the inlet influence is insignificant, and where the depth of water allows more permanent settling of the fines—has a clayey sediment in which there is a surprisingly high content of foraminifera tests. This unusual abundance is probably a result of the slow rate of accumulation of clastic sediments. In looking at sievings of the coarse fractions of samples from this "bay no special influence" environment, we have commonly found that the ½-¼ and ¼-⅛ mm. fractions are predominantly foraminifera, sometimes constituting as much as 90 per cent. A correspondingly small percentage is found of terrigenous minerals such as quartz and feldspar. Thus these various bay environments result in deposits which are quite distinctive in character.

Barrier island sedimentary environments . . . As we've seen, the barrier islands have several distinct zones. Most

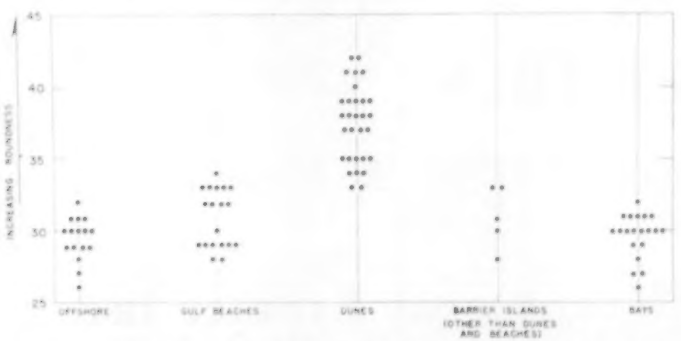

Fig. 3—The coefficient of roundness related to barrier island and nearshore environments.

Fig. 5—The percentage of very fine sand in sediments from the barrier islands and nearby environments.

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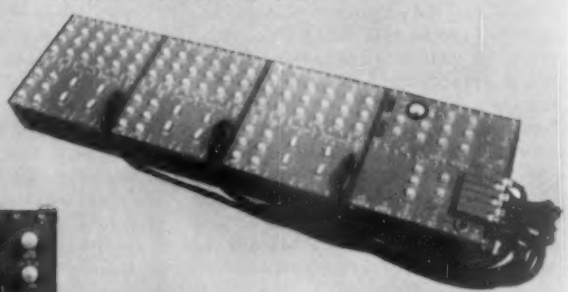

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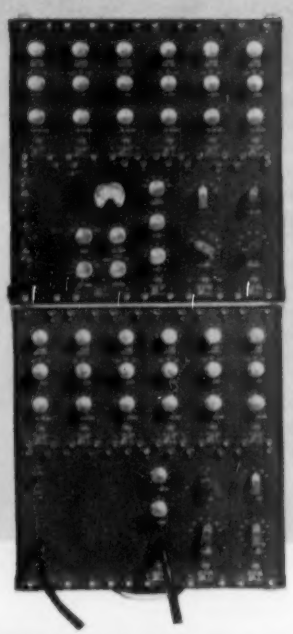

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of the island sediments are high in sand content and the beaches and dunes have very little else besides sand material. The best method which we have found for differentiating beach and dune sands is by a study of the roundness.

To do this, we take the ⅛-¼ mm. sieving and classify 100 grains according to the scale presented by Powers (1953). Almost all of the dune sands in the area are more rounded than the beach sands or the sands from other environments (Fig. 3). The swamp areas inside the dunes have a fairly large amount of silt and clay. So they are more comparable to some of the bay sediments. They differ from them in having mineral aggregates, partly due to evaporation when the flats dry during a protracted time of low sea level. The sediments have more wood fibers and more pollen and spores than the portions of the bays which have an equally high sand content.

The inlets which connect the open gulf to the bays are high in sand, but they contain an appreciable amount of echinoids carried in from the open gulf. The faunas are a mixture of gulf and bay types. The present inlets are small in area at the present time, but much of the barrier-island material may have been made by the filling of old inlets. So the environment may be very important.

Continental Shelf deposits . . . The shelf sediments have one very distinct boundary and another that is more gradational. The sharp break occurs between the sandy sediments, extending out about 1 mile from the coast to about 30 ft. of water, and the sand-silt-clay materials farther out. In one line of very closely spaced samples (Fig. 4), the sediment had a rather sharp break in grain size at the foot of the inner slope and then a more gradational change at greater distances out from shore. This is not true of other profiles, however, particularly of those to the north. The sandy sediments near shore could easily be confused either with the beach sands or with sandy sediments of the barrier flats and inlets.

However, there is one very distinct difference. It is found that the "nearshore gulf" sediments are heavily weighted in the ⅛-¼ mm. grain size, commonly about 80 per cent, which is quite different from the other environments (Fig. 5). Glauconite is also important in this environment so that the samples differ in this respect from the equally sandy sediments on the inside of the barrier islands and along the bay margins where glauconite is rare.

Inner shelf . . . The "inner shelf," beginning where the sand decreases beyond the nearshore gulf, is given a somewhat arbitrary outer boundary at the 20-fathom curve. This is because the foraminifera are predominantly pelagic beyond 20 fathoms, whereas pelagic foraminifera are scarce inside the 20-fathom line. The sediment of the inner shelf is a mixture of sand, silt, and clay in about equal proportions. The material differs in various respects from the fine sediments of the bays. The silt content is normally considerably higher than in the bay sediments.

Outer shelf . . . The sediments of the "outer shelf" are variable in the area. The clay content is high and sand low directly off St. Joseph Island (Fig. 4), but sand is fairly abundant to the north. In the zone of fine sediments off Aransas Pass, the most notable feature is that the coarse fraction (greater than ⅛ mm.) consists to a very large extent of foraminifera. Terrigenous sands (which are principally quartz in this area) are very scarce. Glauconite makes up a smaller fraction, but it can still be recognized in most samples and serves to differentiate these sediments from those found in bays.

To the north, the outer shelf sedi-

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ments are much closer in character to those of the inner shelf. Terrigenous sands and mollusc shells are abundant, so there is a large coarse fraction and glauconite continues seaward as an important constituent. The foraminifera are less important here than on the outer shelf to the south. The submerged hills on the outer shelf (Fig. 2) apparently are covered with shells and coralline types of deposits. It is notable that these hills have a slight ring depression virtually surrounding them.

Third dimensional aspects of the sediments . . . A series of borings were made in the area using light drilling equipment mounted on a barge in the bays and on a truck during work on the islands and on the Guadalupe Delta. These borings attained an average depth of 55 ft. They were supplemented by borings of 20 to 40 ft. in depth made by a hand-operated Porter soil sampler.

The borings along the Guadalupe Delta and along the length of San Antonio Bay have mostly extended down to the base of the Recent or to sediments indicating another cycle of deposition. This base can be determined either by the occurrence of the oxidized Beaumont clay, of presumable Pleistocene age, or a river deposit which was high in plant fibers and devoid of all signs of bay deposition. Above this contact, the deposits differed very little from those being formed at the present day.

The exception was found in the case of the Guadalupe Delta where the borings showed that true delta deposits give out at a depth of 5 to 10 ft. They are underlain by bay deposits which indicate nearness to a river mouth.

With greater depth in the holes, the bay deposits showed less and less influence of the nearby rivers. In three of the holes, great thicknesses of oyster-reef material were encountered, indicating that deposition occurred in conditions not greatly different from the present day. In one hole, near the lower end of the bay, a maximum of about 80 ft. was bored before encountering the deposits of an older cycle.

Under the barrier islands, sandy sediments generally continue for considerable depths—especially in the borings made on the barrier beaches. At one place these sands continued with very little change in character down to about 60 ft. On the bay side of the barrier islands, however, the sediments encountered on top appear to be characteristic of inlets or barrier flats. Underneath, in some cases, they suggest bay environments.

Seaward of the barrier islands, both Humble Oil Co. and Gulf Oil Co. have obtained samples from above the Pleistocene. These were kindly supplied to A.P.I. Project 51. We have found from a preliminary study that the Recent offshore deposits do not extend very far below the bottom. They terminate at about 10 ft. in a well 3 miles seaward of St. Joseph Island. And they are underlain by a considerable thickness of barrier island deposits. Nine miles seaward of Mustang Island, on the other hand, the shelf deposits may be 60 ft. thick and are underlain by both barrier island and bay deposits.

Summary . . . The information given above is only a brief outline of the material which has been gathered in 3½ years of A.P.I. Project 51. It does not discuss some of the special studies that have been made, particularly those already published. The information presented indicates quite clearly that the sedimentary environments in this Central Texas area have very distinctive sediments and the data give good promise that criteria of the type discussed can be used to distinguish between bay, barrier island, and Continental Shelf deposits. Distinguishing the other more specialized environments may also be possible in many cases. The criteria will be tested by comparison of sediments from other areas along the Gulf Coast.

The third-dimensional studies in the

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Rockport-Aransas Pass area indicate that present-day conditions were in existence during deposition of formations down to a considerable depth, especially in the bays and on the barrier islands. Indications coming from Carbon-14 age determinations (provided us by Magnolia Petroleum Co.) make it probable that the barrier islands and the accompanying bay deposits have grown up along with the rise of sea level at the end of the Pleistocene. In this way thick sand deposits developed under what are now the barrier islands and these sand lenses have become flanked with fine-grained materials which may produce future stratigraphic traps for petroleum.

Reference

M. C. Powers (1953), A New Roundness Scale for Sedimentary Particles, Jour. Sed. Pet., Vol. 23, pp. 117-119.

Exploration Highlights

HUGOTON EMBAYMENT

OKLAHOMA PANHANDLE

Beaver County Has New Pay Oil Discovery Well

Lower Missouri lime oil production has been established in Beaver County, the first such pay in the area.

Cabot Carbon Co. 1 John C. Hodges, SW NE 1-5n-24eCM, 2 miles northwest of Mocane town and 2 miles northwest of Morrow-Mississippian Mocane field, flowed 10½ bbl. of oil per hour on 16/64-in. choke. Cabot will drill a southwest offset to the new discovery at 1 Judy in NE SW 1-5n-24eCM.

TEXAS PANHANDLE

Ellenburger Discovery Puts All Other News Aside

Exploratory interest in the Texas Panhandle has shifted to Gray County where Phillips Petroleum Co. 1-A Troy, Section 86, Block M-2, BS&F Survey, flowed 60 bbl. of oil in 1 hour on test of the Ellenburger to bring first such production to the vast Panhandle region.

Phillips tested the Troy discovery at 11,197-11,370 ft. The discovery also flowed 5,200 M.c.f. of gas per day with no water. The wildcat never showed any signs of production until the drill-stem test was taken.

Phillips has another Ellenburger well drilling to the west in Section 118 at the 1-A Talley. Northeast of the 1 Troy Shamrock Oil & Gas Corp. 1 Byram

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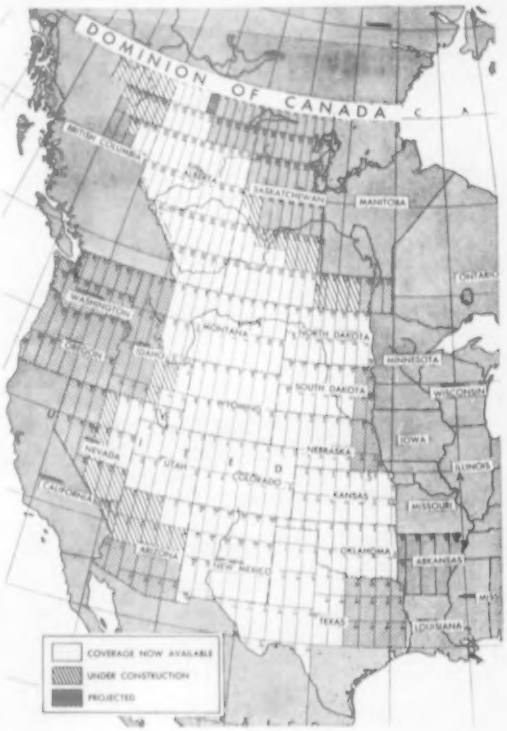

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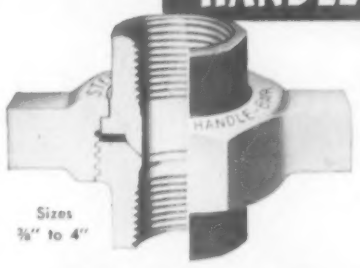

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in Section 47 is scheduled for deepening to the Ellenburger. This wildcat is in Block M-2, H&GN Survey.

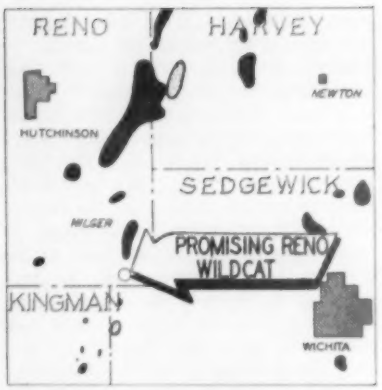
Few wells in the entire Texas Panhandle region have gone to the Ellenburger. The deepest well in the Panhandle, Gulf Oil Corp. 1 Porter in Lipscomb County went to the Ellenburger at 14,278 ft. The closest big Ellenburger production to the 1 Troy discovery is in Andrews County, West Texas. Kent County's Polar Ellenburger area is the nearest Ellenburger field. It is 140 miles northeast to the closest Arbuckle (the Oklahoma and Kansas Ellenburger equivalent) production . . . this is at Yellowstone field in Woods County, Oklahoma. Nearest Kansas Arbuckle production is more than 200 miles due north in Scott County.

MID-CONTINENT

KANSAS

Promising Wildcat Reported Northwest of Wichita

Fleming & Woodman-Frank Oyster 1 Geubelle, NW NW NW 29-26s-4w, Reno County, is a promising test after recovering 3,500 ft. of clean oil on a drill-stem test in the Viola lime at 4,012-21 ft.



Reno County has a promising new wildcat 3 miles southwest of Hilger field.

The Sedgwick basin wildcat is 3 miles southwest of Hilger field. Operators have set casing at 4,028 ft.

Barton County Tallied High Last Year

Barton County operators put down 300 wells last year. Of this total 35 were wildcats, 265 pool wells.

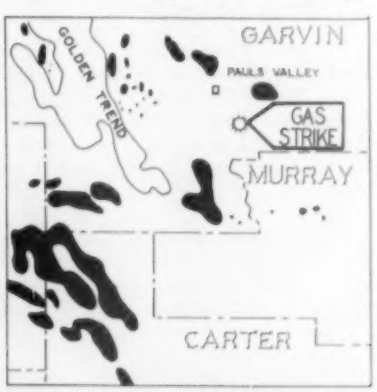
The successful wildcat total was six new oil pools. More than 1,000,000 ft. of hole were dug last year, making this one of the most active areas on the Central Kansas uplift. This is an average of about 3,400 ft. per well. Daily potential of the oil wells was 47,091 bbl. . . . an average of 260 bbl. per well.

OKLAHOMA

Seismic Prospect In Southern Garvin Hints Gas Discovery

Commercial gas production is in evidence at Cities Service Oil Co. 1 State-J in SE SW NW 34-3n-1e, seimic prospect in Garvin County, southern Oklahoma.

The wildcat gaged 4,260 M.c.f. per



Commercial gas production is indicated at a Garvin County wildcat southeast of Pauls Valley.

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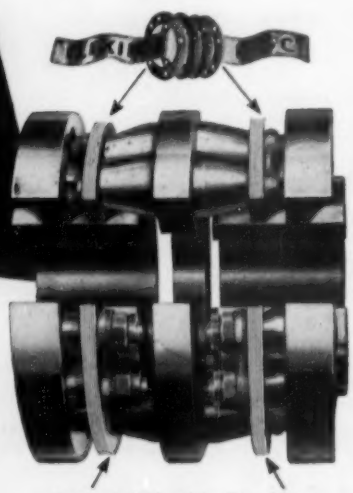

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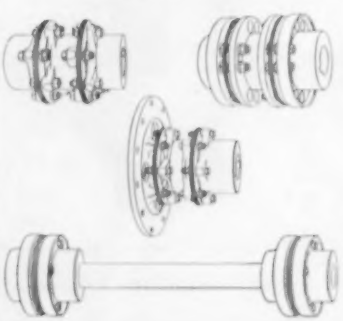

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day on test at 3,525-70 ft. The test was open for 10 minutes. Drilling continues.

Exploration Enters Second Active Month of New Year

January discoveries and development activity promise that the following months of 1955 will be increasingly important to the industry in Oklahoma. At the first of February the following counties highlighted the state's activity: Beaver, Carter, Cleveland, Garvin, Grady, Lincoln, and Texas counties.

Beaver . . . This county is the most active area in the Oklahoma Panhandle. Carter Oil Co. recently expanded leases near the Texas-Beaver county line. The company will be active in 1n-20eCM and 1n-21eCM.

The county has enjoyed great exploratory success of late. One of the best new strikes was at O. H. Parker 1 Hennigh in 28-6n-28eCM. The strike flowed 10,000 M.c.f. of gas plus 20 bbl. of distillate per million from the Morrow sand at 6,070 ft. Cabot Carbon Corp. has found Toronto shows at 5,100 ft. and in the Checkerboard at 5,317 ft. northwest of Mocane field in 1-5n-24eCM. Other majors are operating in the area with a long-period wildcatting program promised for this year.

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Carter . . . This southern Oklahoma county's biggest play is in the south part at a new reservoir in 12-5s-2w, opened by Frankfort Oil Co.

Cleveland . . . Primary development point in this central Oklahoma county is in the vicinity of a Wilcox sand producer in SE SW NW 21-9n-1w, made by Herman Brown. The second Wilcox discovery flowed 180 bbl. of oil daily on small choke from perforations at 7,148-58 ft. Confirmation and offset work is due in the area.

The Short Junction area in SW SW 16-10n-4w was extended recently by Continental Oil Co. Their well flowed more than 400 bbl. of oil per day from the Hunton lime at 8,220-8,316 ft. Fracturing was used to improve the flow at the big Hunton well.

Garvin . . . This county is one of the most active regions in the entire country. There are 119 active operations in the Grady-Garvin Springer trend area. In Grady a 13,000-ft. play is under way in 4-6n-6w.

The Chickasha oil play continues at high speed in Grady County. A deep play to the zones below the Noble Olson sand of Permian age is anticipated this year here.

Lincoln . . . Two of the state's outstanding development areas are Sweet Home and Sunflower fields. Success in the area is quite good with dual completions in the Cleveland and Checkerboard zones.

Texas County . . . The Camrick-Grand Valley field area is growing in all directions. The field continues to add Morrow gas wells. The next few months can expect new pays in the field . . . the Toronto, Topeka, Lansing, and Kansas City.

MISSOURI

Frank C. Greene of the Missouri Geological Survey and Water Resources in Rolla reports that drilling activity in Missouri last year resulted in 22 oil wells, 18 dry holes, and 1 salt water disposal well.

Missouri operators put down 40,348 ft., of which 9,288 ft. were drilled by cable tools and 31,060 ft. by rotary tools. The latter figure includes some footage by cable tools tailing in wells. Drilling statistics by counties includes: Bollinger County . . . one dry hole; Cass County . . . five dry holes; Clinton County . . . one dry hole; Nodaway County . . . two dry holes; Pettis County . . . one dry hole; Platte County . . . two dry holes; St. Charles County . . . one dry hole; St. Louis County . . . 22 oil wells, two dry holes, one salt water disposal; Vernon County . . . three dry holes.

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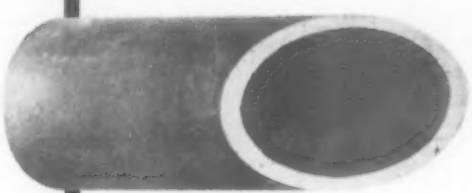

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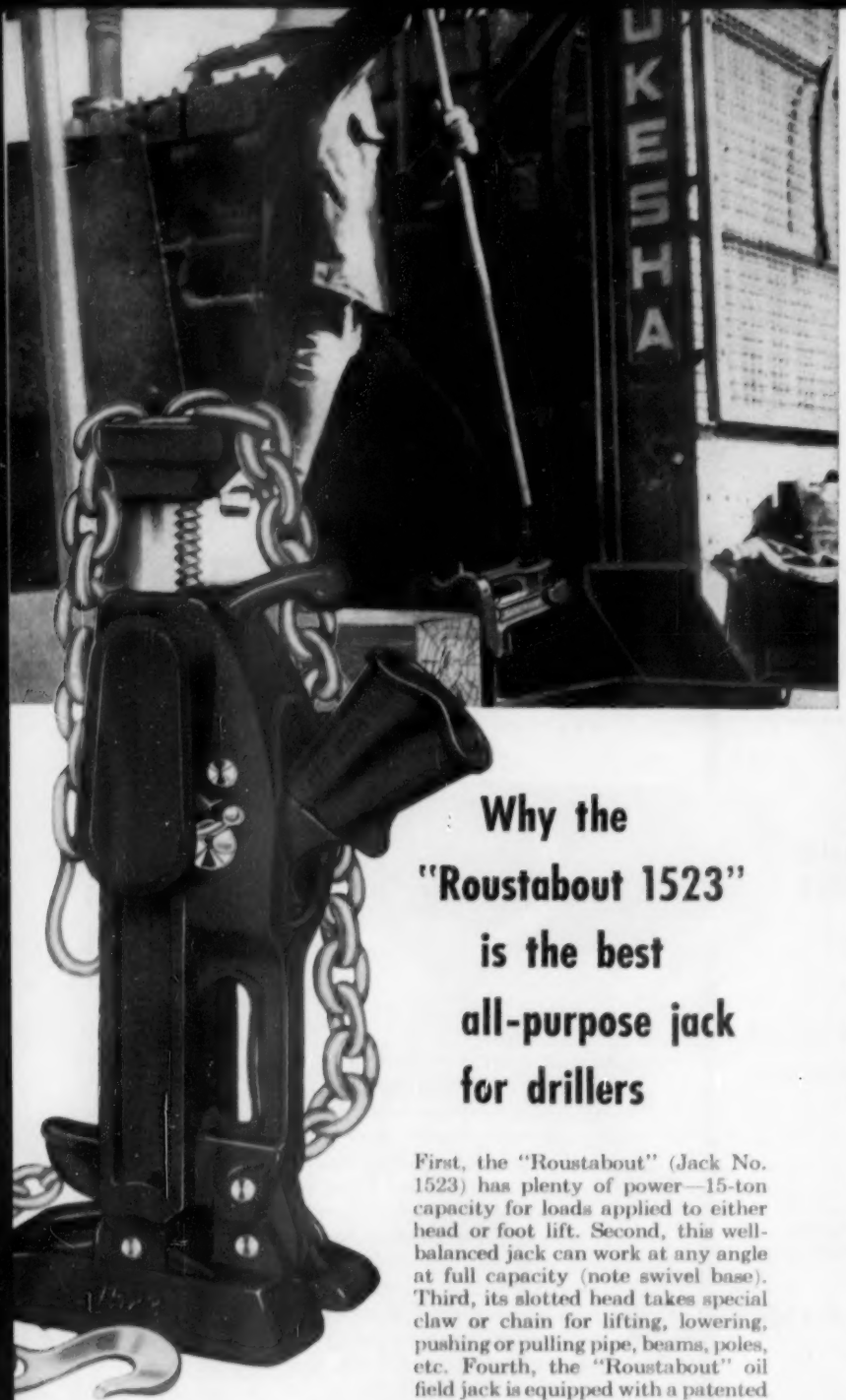

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WEST TEXAS

Strawn Pay Added to Big Lake Field

Strawn, gas-distillate pay has been added to Fusselman, Ellenburger and Permian production in Big Lake field in southwestern Reagan County.

Big Lake Oil Co. 1 University, located ¼ mile north of the town of Texon, flowed 7,000,000 cu. ft. of gas a day, plus 60 bbl. of 67° oil, on completion test. The flow was through open tubing, from perforations at 8,350-58 and 8,383-8,406 ft. Total depth was 9,237 ft.

Nearest Pennsylvanian production is the recent Bend discovery, 2½ miles to the southeast.

Tom Green County . . . Hopes for a heavy producer at Lookabaugh 1 Rust, northwest of San Angelo, were a little dimmer on the basis of further tests. The well flowed 125 bbl. of oil in 20 hours through 10/64-in. choke, from open hole at 6,603-17 ft. Operators decided not to use that gage as a potential, and were installing pump.

Tucker Drilling Co., San Angelo, has made location in the Christoval townsite for an Ellenburger test, which will be drilled as 1 J. D. Robertson. Location is in the Leonard Straus Survey 1829. Nearby production is from the Strawn, around 5,250-5,300 ft.

The proposed test is 2 miles southeast of Group Oil Co. 1 Robertson, drilled last year to 7,850 ft. This well had the Strawn at 5,907 ft. and the Ellenburger at 6,645 ft. on elevation of 2,194 ft.

1954 West Texas Discovery Map

Southwest Mapping Co., Continental Life Bldg., Fort Worth, has its 1954 West Texas discovery map ready for distribution. New fields are shown in red, with old fields and counties in Black. Size is 17 by 18 inches.

ARK-LA-TEX

EAST TEXAS

Smackover Discovery Flows Oil on Preliminary Tests

Last week's oil shows have turned a prospect into a reality, and has further spurred leasing both north and south of the discovery. The well is Humble Oil & Refining Co. 1 Ross, southwest of Mexia in Limestone County.

Operators perforated at 8,565-76 ft.

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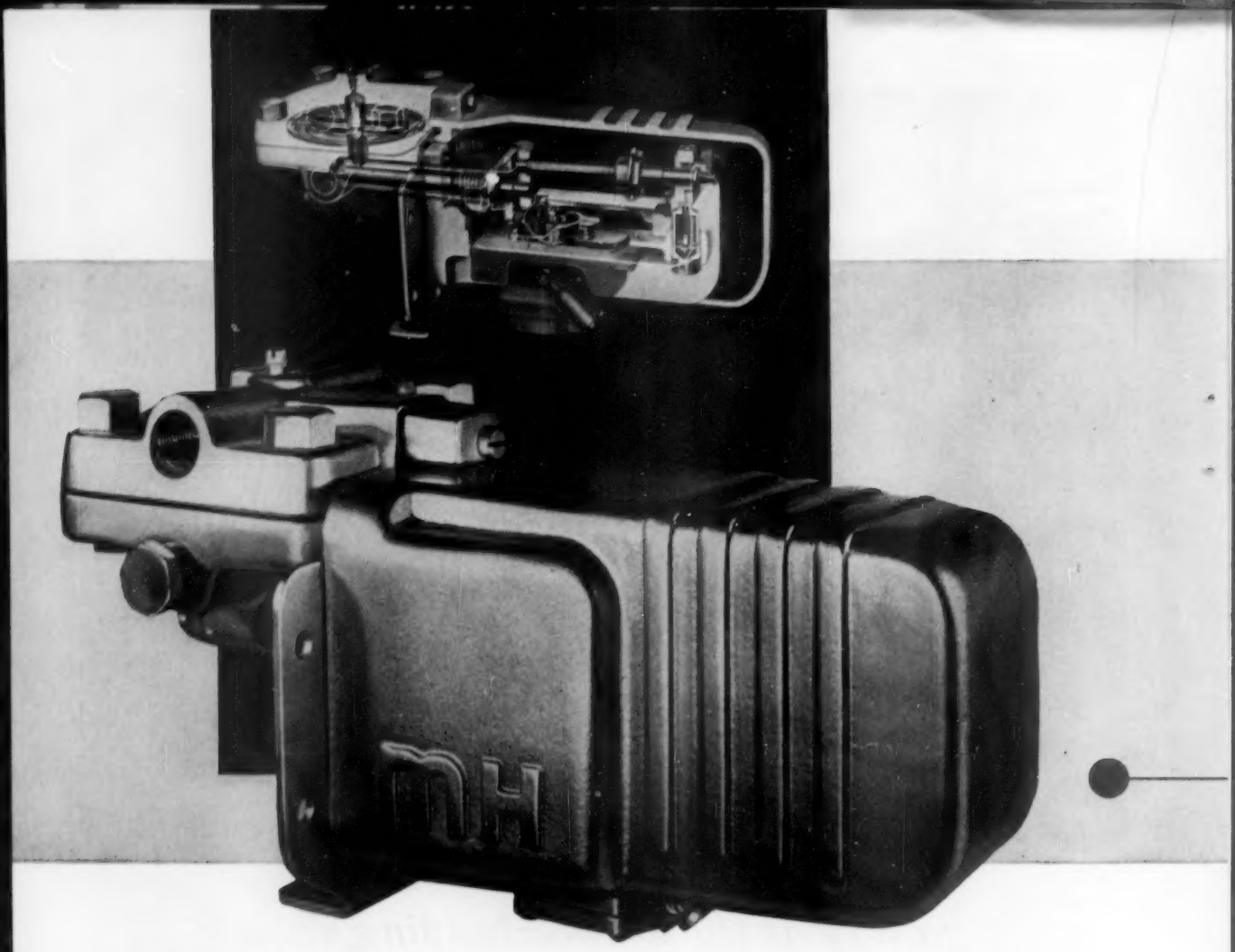

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Teflon diaphragm and stainless steel meter body eliminate usual need for seals or purges.

EASY INSTALLATION
Compact, lightweight unit is easily mounted anywhere.

● ***Plus these new features for liquid level measurements:***

LOWER RANGES
Extended down to 0-14 inches of water for liquid level applications.

VERSATILE CALIBRATION
Direct-reading scale, with up to 100% suppression of calibrated range.

Pace-setting performance for flow measurements— *now for liquid level, too!*

the Honeywell **Differential Converter**

THE remote transmitter that has set new standards of performance in flow applications—the Honeywell Differential Converter—is now available in a new model for liquid level measurements in closed vessels. Suitable for use with either pressure or vacuum vessels, this model offers all the features of fast response, precision, convenience and ruggedness that have earned the Differential Converter wide acceptance throughout industry. The line now covers practically *any* flow or liquid level measurement.

This versatile pneumatic transmitter uses no mercury. It can be used in scores of installations where contamination problems have long impeded measurement. Operating on the force-balance principle, it provides exceptional precision and high-speed response . . . makes possible closer control in the most critical applications.

The ideal companion for Honeywell *Tel-O-Set* miniature indicators, recorders and controllers, the Differential Converter can transmit to any of a variety of Honeywell instruments.

Whenever you have a flow or liquid level measuring problem, you'll find the Differential Converter offers you the top in performance and serviceability. Your nearby Honeywell sales engineer will be glad to discuss your requirements in detail. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Penna.

● **REFERENCE DATA:** Write for Bulletin 2291, "Differential Converter Liquid Level Transmitter", and for Bulletin 1160, "Measuring and Controlling Liquid Level."

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

When swabbed down 2,000 ft. the well kicked off and flowed oil. After cleaning itself, it gaged 121 bbl. of fluid in 11¼ hours through 16/64-in. choke, with some mud and sediment but no water.

Shut in overnight, tubing pressure reached 930 psi. When opened, the well flowed at the rate of 232 bbl. of oil a day through 16/64-in. choke, with gas-oil ratio of 2,330:1. A second potential was scheduled before completion.

On elevation of 464 ft. the well had the following tops: Woodbine 3,272 ft., Goodland 4,062 ft., Paluxy 4,375 ft., Cotton Valley 7,020 ft., and the Smackover at 8,560 ft. Cotton Valley and Smackover tops were by samples.

Since first reports of the well, extensive lease buying has taken place both north and south of the well, along the Mexia-Talco fault system. The play has been reported south into Milam County, and east to Titus County. Price in the general area of the discovery ranged from $10-$25 per acre.

Ellenburger Wildcat Slated For Tarrant County

Tarrant County, currently nonproducing, was in line for an 8,500-ft. test, sufficient to test the Ellenburger. The project is Amon G. Carter 1 Hinton, located 2½ miles west of Keller, in the Francisco Cuella Survey. O. E. Hall Drilling Co. prepared to move in materials at this writing.

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Is A Must!
Dual Prime Model 37 on location in North Texas supplying water for drilling rig. This extremely versatile Packaged Pumper is well suited to a large variety of liquid supply and transfer jobs.
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GULF COAST

SOUTHWEST TEXAS

Navarro Pay Opened In South Pleasanton Field

Navarro production is being opened in South Pleasanton field, 6 miles south of Pleasanton, in Atascosa County. Previous production has been from Carrizo sand.

The Navarro discovery is by C. C. Winn and Eastern States Petroleum Co. at their 1 Downey, completed with a flow of 86 bbl. of 28°-gravity oil per day through ⅝-in. choke. Flow is with pressure of 65 psi. on the tubing.

Pay interval is 5,224-38 ft. with top of the Navarro at 5,223 ft., elevation 407 ft.

Shallower Zone Produces In New San Ramon Well

Multi-pay San Ramon field, in northwestern Hidalgo County, is getting another productive zone, the shallowest yet opened. The new pay, perforated at 8,214-24 ft., is in Chicago Corp.'s 1 Villarreal Unit well, rated good for 11,100,000 cu. ft. of gas daily with gas-condensate ratio of 93,400 cu. ft. per barrel. Shut in, the well built up pressure of 4,947 psi. Flowing pressure through ¼-in. choke is 4,562 psi. with production rate at 1,630,000 cu. ft. of gas daily. Three other zones, ranging in depth from 8,350 ft. to 8,800 ft., have proved productive. All are in the Frio-Vicksburgh section.

Alice Wildcat Gets Gas

Appell Oil & Gas Corp. has a new gas-condensate discovery west of Alice in Jim Wells County, where its 2 Misenheimer, in Share B, La Tinaja de Lara Grant, flowed at an estimated rate of 21,000,000 cu. ft. of gas per day from sand at 4,818-22 ft. Condensate recovery was at the rate of 9.7 bbl. per million cubic feet.

TEXAS GULF COAST

Deep Sand Produces in Gillock Area Discovery

John W. Mecom and associates have a new gas-condensate discovery in the Gillock area, Galveston County. Their 4 Ervine & Bishop, 1½ miles west of production, produced at the rate of 1,-

760,000 cu. ft. of gas and 362 bbl. of condensate during a 5-hour gage through various chokes. Water production was at the rate of about 45 bbl. per day. Flowing pressure was 5,700 psi. Condensate gravity was 53.8°. Production is from Frio sand with perforations at 13,438-54 ft. Total depth is 15,029 ft.

Location is 3½ miles southwest of Dickinson.

"Dry" Hole in Louise Area Finds New Gas Production

An old "dry" hole located 1¼ miles east of Louise field and about the same distance northwest of Hillje field, in western Wharton County, has been converted into a gas well estimated good for 210,000,000 cu. ft. daily, open flow.

The well, 1 Hutchins & Pearson, drilled last July to 7,250 ft., was reworked by Sparta Oil Co., which drilled out to 7,226 ft., ran casing, and perforated at 7,168-73 ft., opposite Frio sand.

Flowing pressure of 2,600 psi. was gaged.

Location, in the W. E. Bell Survey 52, is 6 miles south of Hillje townsite.

Satsuma Wildcat on Pump

Sinclair Oil & Gas Co.'s new discovery well, 1 Fraser, a mile north of Satsuma, northwest of Houston, in Harris County, pumped 86.68 bbl. of 41.1°-gravity oil daily at completion in sand at 6,560-64 ft. It had gas-oil ratio of 367 cu. ft. per barrel. Hole was drilled to 7,945 ft. Location is 3¼ miles northwest of Fairbanks field, and 3½ miles north of Satsuma field.

SOUTH LOUISIANA

New Oil-Producing Area Opened in Iberia Parish

Continental Oil Co. is opening a new field in the northeastern arm of Iberia Parish, 25 miles east of New Iberia.

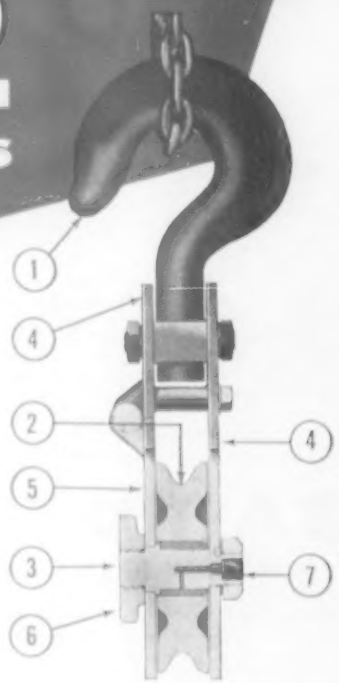
Its discovery well, 1-C Jeanerette, testing Miocene sand at 7,447-53 ft., flowed at the rate of 159 bbl. of 35.9°-gravity oil per day through ⅛-in. choke. flow was with pressure of 750 psi. and gas-oil ratio of 173 cu. ft. per barrel.

A previous test with perforations at 12,207-32 ft. got a flow of 3,876,000 cu. ft. of gas and 16 bbl. of condensate per day through 15/64-in. choke with 3,100-psi. pressure.

Total depth is 13,012 ft. with casing at 12,512 ft.

Location, in 11-12s-10e, is in the Little Bayou Pigeon area, about 1½ miles northwest of Bayou Pigeon field. The latter field, discovered in 1940,

THE Inside Story of WECO SNATCH BLOCKS



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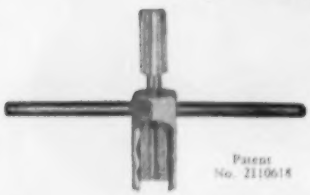

A tool for rechasing damaged sucker rod threads to original thread pitch dimension. The tool can be used when running rods back into the well for removing dirt, sand or scale from box and pin threads before screwing up to insure proper shouldering.

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produces from an 8,100-ft. middle Miocene sand.

Extension Well Confirms Bayou Sorrell Oil Find

Oil production opened last week in the new Bayou Sorrell field, southeastern Iberville Parish, is being confirmed by another well extending the production more than 1 mile to the northeast.

Both wells were drilled by Shell Oil Co., which discovered the field last September with a gas-condensate well, until now the only producer.

The discovery well, 1 Schwing, in 99-10s-10e, produces from Miocene sand at 10,974-80 ft. The two oil wells are completed in a 9,290-ft. sand.

The first oil well, 1-A Schwing, drilled as a southwest offset to the discovery well, is perforated at 9,286-92 ft. Its flow, through ⅛-in. choke, was at the rate of 227 bbl. of 41.8°-gravity oil per day with pressure of 1,930 psi. and gas-oil ratio of 1,286 cu. ft. per barrel.

The confirmation and extension well, 1-B Schwing, is perforated at 9,290-96 ft., and flowed at the rate of 162 bbl. of 40.8°-gravity oil per day through ⅛-in. choke. Its pressure was 1,855 psi. and gas-oil ratio 1,481 cu. ft. per barrel.

The area is about 4½ miles southwest of Sullivan's Lake field, and about 6 miles south of Bayou Blue.

Third Oil Sand Proved In St. Mary Offshore Field

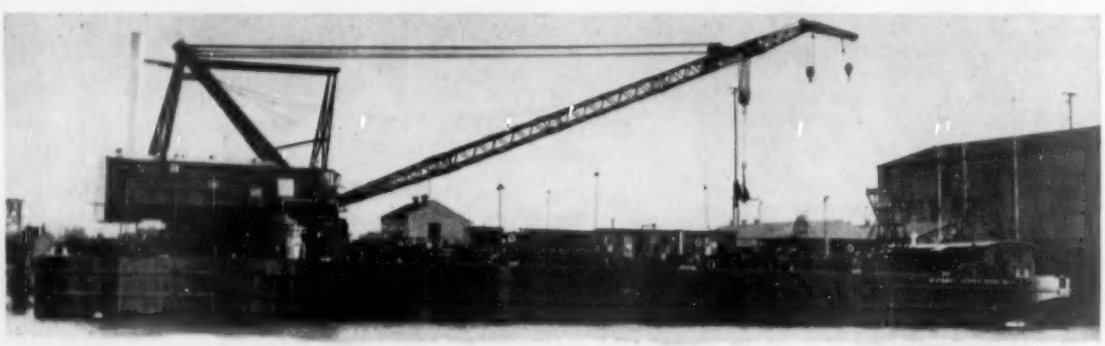
Shell Oil Co. has opened another oil-productive sand in its Eugene Island Block 18 field, off the coast of St. Mary Parish. The new sand, the third and deepest so far proved in this field, is perforated at 10,016-20 ft. Its discovery well, 1 State Lease 1666-Block 14, flowed through ⅛-in. choke at the rate of 324 bbl. of 38°-gravity oil per day with pressure of 1,725 psi. and gas-oil ratio of 555 cu. ft. per barrel. The well is the fourth in field.

The field's discovery well, completed last June, and the second well produce from 9,370-ft. sand. The third well is in a 9,075-ft. sand.

Church Point Field Adds New Gas-Condensate Pay

Pan American Production Co. and Sunray Oil Corp. is adding another gas-condensate reservoir at the prolific and widespread Church Point field, Acadia Parish.

Their 1 Beaugh Unit, in 79-8s-2e, on the west side of the field, opens the



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reservoir, perforated at 1,368-76 ft. (U.S No. 1 sand), with a calculated open-flow potential of 20,000,000 cu. ft. of condensate-bearing gas. Tested through 5/32-in. choke, it flowed at the rate of 2,000,000 cu. ft. of gas daily with condensate recovery at the rate of 80 bbl. per million cubic feet.

A previous drill-stem test of perforations at 12,156-98 ft. recovered some 37.6°-gravity oil. This was the first indication of oil production in the field.

West of the new well, and just east of Sunray Oil Corp.'s Northwest Branch field, Sunray is starting a new deep test at 1 Wright, which may prove a link between the two areas.

GREAT LAKES

MICHIGAN

Southeast Extension Seen For Ensley-Traverse Oil Pool

Ace Oil Co. may have extended the late 1954 discovery, Ensley-Traverse oil pool in Newaygo County, further to the southeast. It also appears that the extension well is the most important to be drilled in the area since the discovery well was finaled. However, it appears that more testing at this outpost was necessary before this major and significant extension could be confirmed definitely.

Ace 1 Cushman, SW NW SW 8-11n-11w, which carried a show of oil natural, rated good before acid for about 1 bbl. in 12 hours. On first test after acid, the well pumped 5 bbl. of net oil and then appeared to be pumped off. After being shut in for 16 hours, the well pumped and flowed another 5 bbl. of oil in 17 minutes. Top of the Travers lime was logged at 2,452 ft.

Meanwhile the first follow-up producer to the Ensley field discovery was completed at the north 20-acre offset at Leonard Oil Co., Inc. 1 Cook, SW SE SW 6-11n-11w. The well was rated at 72 bbl. of oil and 20 bbl. water daily after acid. This is short of the potential demonstrated by the discovery well which has now been producing quite satisfactorily into its second month. Top of the Traverse at 1 Cook was logged at 2,426 ft.

Two other Ensley area tests, one an outpost to the northwest and the other the direct west 20-acre offset to the discovery producer, were drilled out dry in the Traverse, along with a third test drilled dry at the north 20-acre offset to the Ace 1 Cushman.

The northwest outpost to the Ensley discovery, which was dry, was the Edwin Ryder & Dale Arnold 1 Barendreght, NE NE SE 1-11n-12w, Grant Township. The west 20-acre offset failure was the James J. McGerry, Trustee 1 Butler, NE NW NW 7-11n-11w. The southeast outpost failure was Carleen & Sole 1 Bennitt, SW SW NW 8-11n-11w.

APPALACHIAN

PENNSYLVANIA

In Gaskill Township, Jefferson County, Southwest Pennsylvania, Fairman Drilling Co. 1 Clair Reed, rank wildcat, was dry, Oriskany sand 7,504-11 ft., TD 7,611 ft.

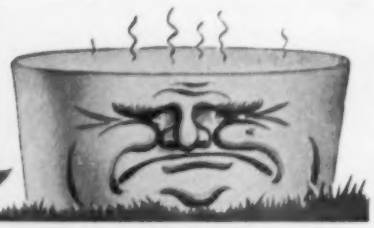
WEST VIRGINIA

Blue Sulphur district, Greenbrier County, West Virginia, Columbian Carbon Co. 1-1193 W. E. Hedrick, wildcat, elevation 2,349 ft. was dry, chert 6,897 ft., Oriskany sand 6,995-7,094 ft., TD 7,130 ft.

● Grant district, Jackson County, Oriskany sand wildcat tests were dry, D. D. Foster 1 I. A. Taylor, elevation 715 ft., TD 4,404 ft., and Talbott Gas Co. 1 U. G. Talbott, elevation 840 ft., TD 4,606 ft.

● Logan district, Logan County, another large volume gas well was completed in the further development of this area. It was Columbian Carbon Co. 1204 Crystal Block C. & C. Co.,

EVER SEE TANK STORAGE *Profits* LITERALLY DISAPPEAR INTO THIN AIR?



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ENARDO No. 530 VAPOR CONTROL HATCH

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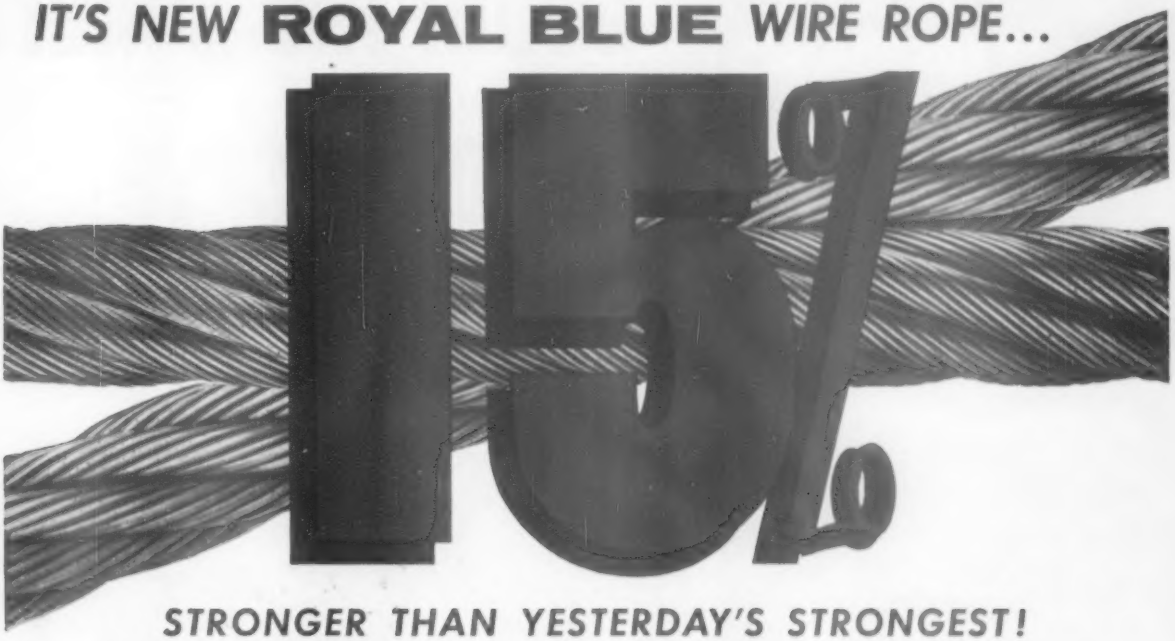

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gage 19,290,000 cu. ft., of gas, natural Big lime formation, TD 3,191 ft.

EASTERN KENTUCKY

United Fuel Gas Co. has abandoned another test in their series of wildcat tests on Fordson Coal Co. lands in Clay and Leslie counties. The 9 Fordson Coal was drilled to a total depth of 2,850 ft. after testing the Devonian black shale 2,430 to 2,745 ft., Corniferous lime 2,751 to 2,833 ft. and the Clinton formation 2,833-50 ft. Shows of gas were had but failed to respond to Stratafrac treatment.

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EASTERN INTERIOR

ILLINOIS

New Edwards County Oil Pool Growing Rapidly

The accompanying map shows the highly active new Aux Vases and McClosky lime oil area just east of the town of Albion in 1-2s-10e.

Allen Bros. is developing the area

along with Virgil I. Helgen. Helgen 1 Fewkes, SE SE NE 1-2s-10e, is the best Aux Vases sand well to date in this area. That well flowed and swabbed 56 bbl. of oil in an hour or at the rate of 1,344 bbl. per day through perforations at 3,050-62 ft. Allen Bros. has good wells in the field producing from both zones.

- In Crawford County W. T. Frederking and A. P. Wageman 1 Frost heirs, NE SE SW 6-5n-12w, 5 miles sou.hwest of Robinson made 192 bbl. of oil per day from the Benoist at 1,361-75 ft.
- In White County Giliam Drilling Co. 2 Charles Ford et al, SW SE SW 18-5s-14w, 7 miles due east of the city of Carmi, flowed an average of 840 bbl. of oil per day for 2 weeks after fracturing in the Aux Vases 2,937-67 ft.

Drilling in Illinois Increases in January

Drilling for oil and gas in Illinois continued in January the upward trend begun in 1954. Reports that 303 wells drilled for oil and gas were completed in a 4-week period in January, or about 76 per week, an increase of 20 wells per week over the December completions. Production for the month is estimated at 6,351,000 bbl.

Two new oil pools were discovered in January: Exchange East in Marion County and Samsville Northwest in Edwards County. Extensions to the following seven pools were reported: Hill East in Effingham County, Shawneetown East in Gallatin County, Eldo-

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rado North in Saline County, Mount Auburn Consolidated in Christian County, Sailor Springs Consolidated in Clay County, Ellery Consolidated in Wayne County, and Gays in Moultrie County. Gays had been an abandoned one-well pool. Two new pays were also reported, the Golconda limestone in the Roland Consolidated pool and the Bethel sandstone in the Shawneetown East pool.

WESTERN CANADA

ALBERTA

Hudson's Bay Comes Up With Week's Best Strike

Hudson's Bay Oil & Gas Co. came up with the most promising strike in the western provinces last week with the discovery of 30°-gravity oil at a wildcat in the Westward-Ho area of southwestern Alberta, 17 miles west of Olds.

This well, Hudson's Bay - Oilwell Operators, Ltd., 1 Westward-Ho LSD 7, 8-33-4w5, tested the Mississippian at 8,758-72 ft. The crew is pulling pipe to determine the recovery.

Cooking Lake area . . . Husky Oil & Refining Co., Ltd., and Union Oil Co. of California discovered light-gravity oil at a test in the Cooking Lake area of central Alberta.

This well, Husky-Imperial 1 Cooking Lake, LSD 11, 21-52-22w4, discovered oil in the D2 zone of the Devonian. Crew is running production casing.

Pine Creek area . . . Sun Oil Co.'s wildcat in the Ghost Pine Creek area of Alberta, which was reported earlier as a basal quartz formation gas discovery, gave up a more substantial flow rate on later test of that same pay. This well is 60 miles northeast of Calgary. It is the Sun 15-14 Pine, LSD 15, 14-31-22w4. Gas reached a maximum of 10,670 M.c.f. per day.

Pembina region . . . Stanolind Oil & Gas Co.-Hudson's Bay A-66 Pembina Crown flowed 228 bbl. of oil in 21 hours through 16/64-in. choke for a calculated 24-hour potential of 261 bbl. Gravity of the oil is 40.4°. The Cardium sand was topped at 5,286 ft. The well was drilled to a total depth of 5,356 ft. No. A-66 is in LSD 10, 11-48-9w5.

BRITISH COLUMBIA

British Columbia Gas Strike Confirmed by Union Oil Co.

Union Oil Co. of California confirmed reports of a new gas discovery in British Columbia, about 60 miles north of Fort St. John and 16 miles west of the Alberta border.

Union Oil Co. of California has a rank gas discovery in British Columbia, 35 miles northeast of nearest production.

On a drill-stem test of the Triassic interval from 3,417-37 ft. the wildcat tested at the rate of about 5,000 M.c.f. of gas per day. The nearest production is about 35 miles to the southwest. The discovery well, 1 Milligan, is jointly owned by Union, Hudson's Bay, and the British American Oil Co. on a 255,000-acre provincial reservation.

Blueberry River area . . . Canada Southern Petroleums, Ltd., also recorded a gas discovery in the Triassic at a

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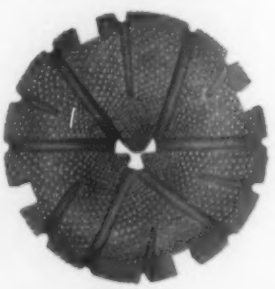

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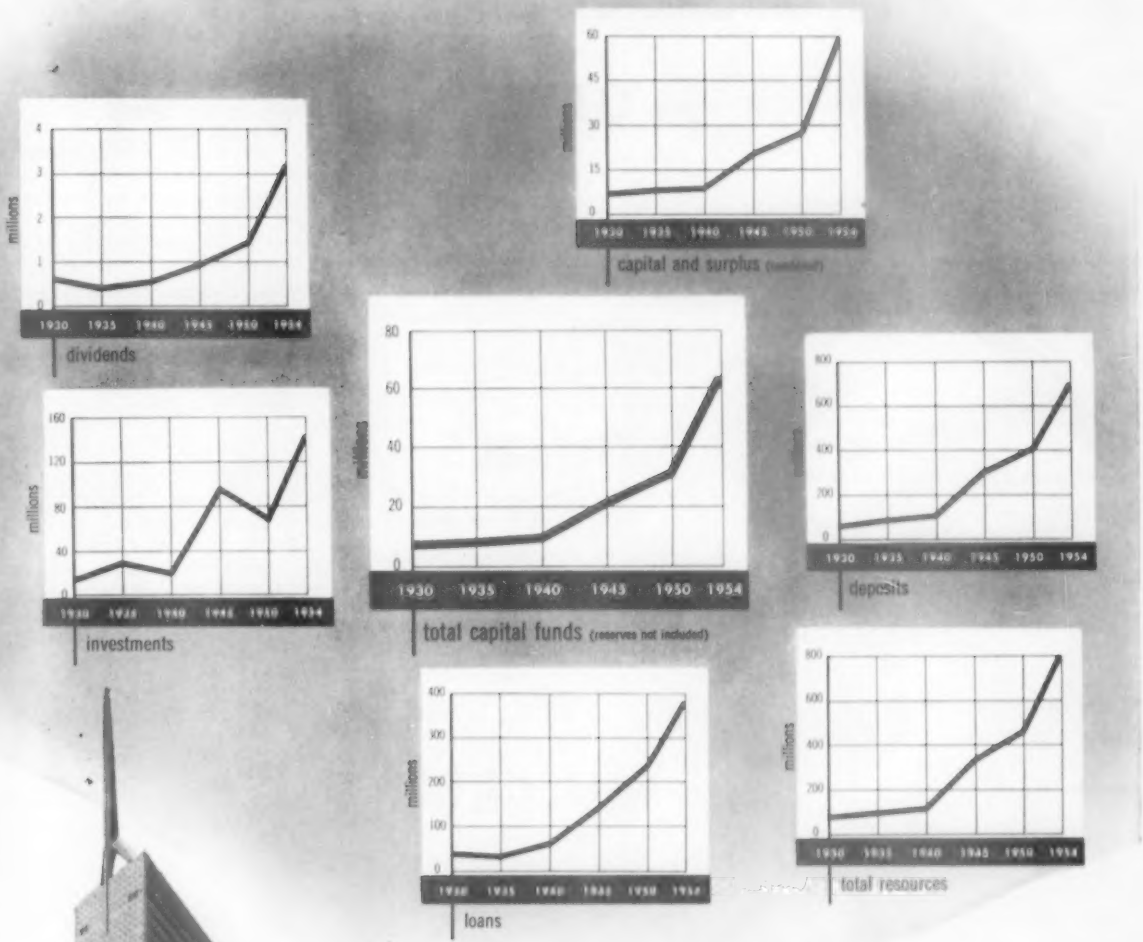

In less than a single generation, Republic National Bank of Dallas has progressed from a small local bank to become the largest bank in the South and the 19th largest in America in capital and surplus. This growth is diagrammed in the above charts. We take pride in this record of growth, and acknowledge appreciation to our many friends throughout the country who have made it possible.

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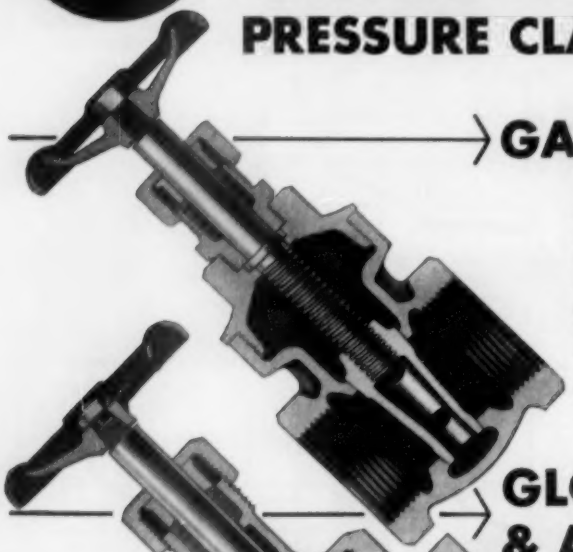
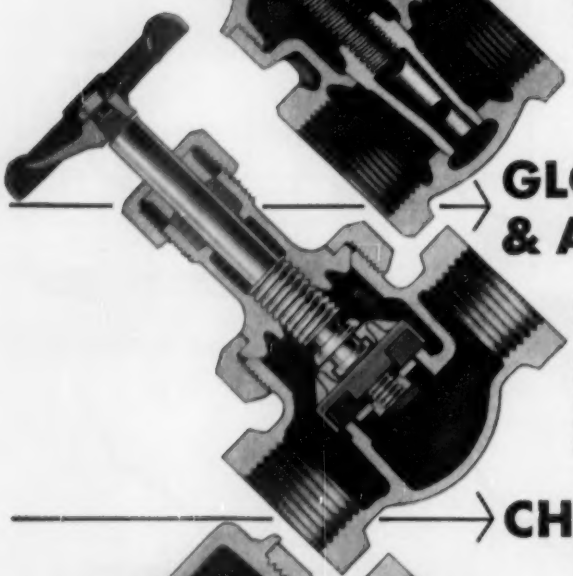


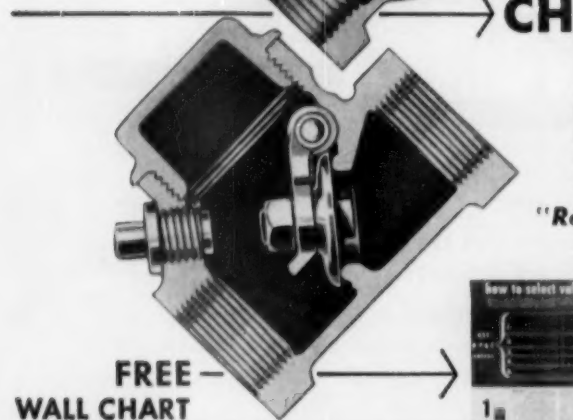
GATES

Fig. 86 illustrated, rated for 125 lbs., steam, 200 OWG, has stationary stem, solid wedge, screwed ends. Other 125 lb. models with screwed bonnet, rising stem, solid or split wedge.



GLOBES & ANGLES

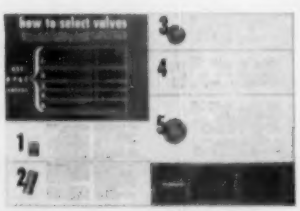
Fig. 1A Globe illustrated, rated 150 lbs. steam, 300 OWG, has renewable asbestos disc, union bonnet. Also furnished as Angle. Sizes ⅛" to 3".



CHECKS

Fig. 198 illustrated, rated for 125 lbs. steam, 200 OWG. Other swing check valves in 150, 200, 300 lb. classes.

"Reliable Protection & Control"



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Better Values

wholly owned wildcat in northeastern B.C. This well, Canada Southern 1 Alaska Highway, flowed 1,704 M.c.f. of gas per day. It is 8 miles north of Triassic gas production at White Blueberry Mountain.

PACIFIC COAST

CALIFORNIA

New Fresno Field Given Three Sites

Los Nietos Co., wholly owned subsidiary of Union Oil Co., was under way with an eastern confirmation test at the 10,700-ft. Eocene pool it discovered near Guijarral Hills in Fresno County. In addition to 75-1 Bourdieu, it staked 44-1 Sanger as a northwest offset to the discovery. Standard Oil Co. of California, which like Union has large holdings in the area, staked 64 1H as a northeast offset.

Labeled Polvadero field, the discovery is expected to develop into major proportions. In drilling to 10,737 ft. the wildcat, 55-1 Bourdieu, cored Gatchell sand below 10,592 ft. About 60 per cent of the pay is oil sand, based on core samples. Soon after its early-February completion it produced 1,635 bbl. of 29°-gravity oil through a 26/64-in. choke. Tubing pressure was 1,200 psi. Gas output was 1,212 M.c.f. daily.

Belgian Anticline Extended

A Superior Oil Co. wildcat ½ mile southwest of Northwest Belgian Anticline field, Kern County, was completed flowing 30°-gravity crude at a 50-bbl. rate. A new pool opener, 1 Forbes was completed in a tight Point of Rocks sand (Eocene) after the perforated section 4,118-26 ft. was Hydrafraced. Location of the discovery is in NW NE 21-30s-21e.

Reyes Peak Wildcat

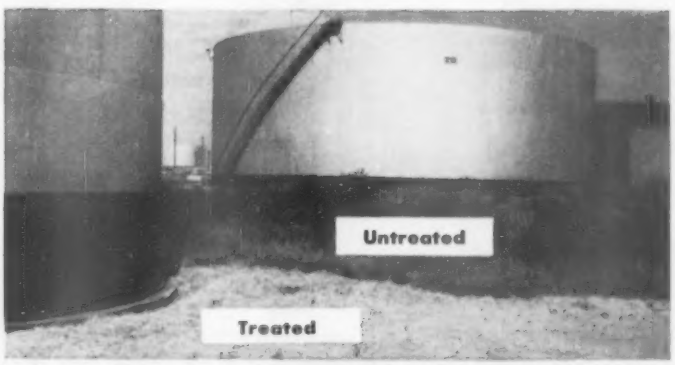
Ohio Oil Co. has staked location for 1 I.M.R.-Government in the remote Reyes Peak area of Ventura County, some 15 miles northwest of nearest oil production at Ojai. Elevation will be 4,500 ft. Located in 30-6n-23w, it will be 5 miles southeast of the 9,750-ft. wildcat Standard Oil Co. of California abandoned in 1952.

Ventura Test Plugged Back

Lloyd Corp., Ltd., has plugged back 1 Wm. Sexton after reaching 16,492 ft., the deepest any well has ever drilled at Ventura Avenue. After tests reportedly found the deeper show wet,

Weed and Brush Control lasts longer with Du Pont TELVAR® and AMMATE®

Weed Killers — *Weed and Brush Killer*



Fire hazards are reduced around oil storages from thorough, long-term weed control with Du Pont "Telvar." "Telvar" is non-corrosive, won't harm application equipment.

Heavy weed growth was controlled with one application of "Telvar." "Telvar" keeps pipelines and key areas accessible, efficient to work around.

"Telvar" is ideal for weed control around derricks, pumps, storages. "Telvar" is easy to apply; extremely low in toxicity to humans and animals; non-flammable; and non-volatile.

One application of "Telvar" solves weed problems for a season or longer!

"Telvar" kills through the roots . . . prevents regrowth. Low dosages (20 to 80 lbs. per acre) make it cost little for the results you obtain. Low rates also mean less handling, less storage facilities. If you're looking for a way to cut maintenance costs to new low levels, include "Telvar" in your weed-control program. Available in two formulations: "Telvar" W; and "Telvar" DW, which is especially suited for light, sandy soils and in areas where annual rainfall is higher than 20 inches.

"Ammate" kills more kinds of brush and keeps it down longer than most weed and brush killers!

When the original spray job is well done, brush is kept under control with nothing more than an occasional spot spray later. You can rely on "Ammate" to do the job safely, even where your rights-of-way adjoin crop land, because "Ammate" is not volatile. There are no vapors to drift onto sensitive crops.

FREE ILLUSTRATED BOOKLETS describe how to control weeds and brush with Du Pont chemicals. For your copies, write to Du Pont, Grasselli Chemicals Dept., Rm. D 4032, Wilmington, Del. In Canada—Du Pont Company of Canada Limited, Box 660, Montreal.

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On all chemicals always follow directions for application. Where warning or caution statements on use of product are given, read them carefully.

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GM DIESEL
CASE HISTORY No. 534-224

USER:
John W. Mecom Company,
Port Sulphur, Louisiana

INSTALLATION:
Four GM "Quad 6-71's" driving Oilwell 200 draw works and Emsco D8-50 mud pumps; GM "Twin-6-71" driving rotary.

PERFORMANCE:
Tool Pusher J. E. Edwards reports, "These GM Diesels give us good, dependable, flexible service." With the "Quads" he can use from 2 to 16 engines to run his draw works or mud pumps, tailoring rig power to load demands.

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DIESEL POWER

Four "QUADS" and a "Twin"

Unmatched Flexibility for a Floating Rig

One of the most powerful offshore rigs in operation today is John W. Mecom Company's "Max Prather." Four sets of General Motors Diesel "Quads" and a "Twin 6-71" (18 6-71's in all) give the rig a total of 2300 continuous heavy-duty horsepower.

Flexible GM 2-cycle Diesel multiple units let you tailor your power to drilling needs. Use only as much power as you need spudding into the hole—and as the tool drills deeper and mud pressure increases "cut in" more engines for faster drilling and quicker round trips. You can service an engine in a "Quad" while you're drilling—just shut one engine down and let the other three handle the load.

The greater compactness of GM Diesel engines, which means easier moves on land, lets them fit on smaller, less expensive platforms for offshore operations. And quick-accelerating 2-cycle operation speeds round trips for more time on bottom making hole.

GM 2-cycle Diesels cost less to buy, less to install, less to run and less to maintain. Parts and service are available through a *world-wide* distributor organization. See your nearest distributor for full details.

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MISSISSIPPI—Jackson
TAYLOR MACHINERY CORP.

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hole was plugged to 15,025 ft. and testing started at the interval 14,120-14,520 ft. The deep wildcat is located in the extreme eastern portion of the field, in 20-3n-23w.

ROCKY MOUNTAIN

UTAH

Bluebell Wildcat Completed As Gas Discovery

Carter Oil Co. has completed 2 Bluebell Unit, C SW NW 3-1s-2w, Duchesne County for a flow of 5,370,000 cu. ft. of gas per day with production from Green River. Production is from perforations 7,895-7,909 ft. The operator drilled to total depth of 9,725 ft. and tested several intervals uphole with varying gas recoveries. The wildcat made good oil recoveries on two drill-stem tests in Green River, but no attempt was made to complete for oil production.

WYOMING

Washakie County Wildcat Preparing for Completion

Superior Oil Co. is installing pump at 1 Government-Chittim, C SW SW 29-47n-90w, in the Sherard area of Washakie County. The operator has reported no swab recovery, although swab tests of Phosphoria was run. Test of Phosphoria, reported earlier recovered heavily oil cut mud from the interval 8,793-8,838 ft. The formation has been acidized. The apparent discovery is 4 miles southeast of Phosphoria production at Cottonwood Creek and about 12 miles east of Worland.

Pinedale Tests Continue

Continental Oil Co., El Paso Natural Gas Co., and Malco Refineries, Inc., reported a flow of 2,400,000 cu. ft. of gas per day at 1 Pinedale Unit, C NE SE 9-30n-108w, in the Pinedale unit, Sublette County. Tubing pressure was 2,000 psi. after 12-hour shut in period. The operators are continuing tests, with shut in periods of as much as 72 hours reported. A second well on this unit is preparing to spud, and the operators will use gas production from the discovery as a circulating medium. This practice has become increasingly popular in the Green River basin in recent months.

Successful Wildcats

SOUTHWEST TEXAS

Travis County: Houston-Oklahoma 3 Olson, Thomas Smith Sur. 24 (10 miles north of Manor). IPP 14 BOPD (net), 50 per cent water, 34°, open hole 556-64 ft. TD 564 ft. (New field.)

GULF COAST

Aransas County: F. William Carr 1 Crow & Martin, Lot 1, Block 224, J. H. Phillips Sur., A-175. IP 116.45 BOPD, ⅛-in 41°, perforations 7,310-18 ft. (Marginulina). TD 8,907 ft. (Extends East Aransas field.)

Bee County: H. R. Smith 1 Brown, W. C. Croft Sur., A-415. IP 2,200 M.c.f. daily, dry gas, open-flow potential, Slick sand 6,880-86 ft. (perforations), and 7,600 M.c.f. daily, GCR 21,300 cu. ft. per barrel, 69°, Mackhank sand 7,178-88 ft. (perforations). TD 7,230 ft. (Extends West Cosden field.)

Jackson County: Sun Oil Co. 2 McDaniel, Elisah Burton Sur., A-286. IP 46,000 M.c.f. daily, open-flow potential, GCR 106,500 cu. ft. per barrel, 56.5°, perforations 5,862-70 ft. TD 5,951 ft. (New pay and second well in unnamed field, 15 miles northwest of Edna.)

Refugio County: Fitzpatrick Drilling Co. 2 O'Brien, Refugio Town Tract. IP 120 BOPD, 3/32-in. choke, 42°, perforations 6,381-84 ft. (Frio). TD 6,450 ft. (New pay in Refugio field.)

Victoria County: Kirkwood & Co. 1 Heinke, IRR Sur. 56, A-418. IP 7,500 M.c.f. daily, open-flow potential, dry gas, perforations 2,576-82 ft. TD 4,515 ft. (New pay in Southwest Salem field.)

EAST TEXAS

Henderson County: Pure Oil Co. 1 Stephens Lake Land Co., W. Keese Sur., 7 miles SW Malakoff. IP 196 BOPD, 16/64-in., TP 300 psi., 43°, Rodessa 7,436-44 ft. TD 8,190 ft., elev. 270 ft.

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Tested to 80% of minimum yield

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WEST CENTRAL TEXAS

Shackelford County: A. A. Smith 1 Vickers, Sec. 212, ETRR Sur., 2½ miles SE Lueders. IPP 48 BOPD, 36°, Saddle Creek lime 1,584 ft. TD 1,620 ft.

Stonewall County: J. J. Lynn 1 Pumphrey, Ben McCulloch Sur., 2 miles N Old Glory. IP 170 BOPD, 20/64-in., TP 100 psi., GOR 780, 41°, conglomerate 6,005-15 ft. TD 6,079 ft., elev. 1,640 ft.

Taylor County: Texas Pacific Coal & Oil Co. 1 Holley, Lot 4, Guadalupe Lge. 144, 4 miles W View. IP 36.7 BOPD, 26/64-in., TP 50 psi., GOR 670, 38°, Fry sand 4,580-90 ft. TD 5,348 ft., ground elev. 1,995 ft.

NORTH TEXAS

Archer County: The Texas Co. 1-C Perkins, Lot 2, ATCCI. Subd., Blk. 11, 4 miles SE Mankins. IP 125 BOPD, open 2-in. tubing, TP 20 psi., GOR 315, 41.5°, pay 1,622 ft. TD 5,205 ft.

Clay County: L. T. Burns 1 Halsell, Blk. 11, WCRR Sur., 6½ miles SW Henrietta. IP 101 BOPD, 10/64-in., TP 120 psi., 39°, GOR 250, Strawn sand 4,876-4,905 ft. TD 5,007 ft.

Grayson County: Standard Oil Co. of Texas 1 Moore, Henry Brown Sur., A-86, 2 miles NE Sherman. IP 285 BOPD, 37.9°, TP 550 psi., 16/64-in., GOR 815, Viola lime 9,147 ft. TD 9,189 ft., ground elev. 746 ft.

Wichita County: K L B Drilling Corp. 1 Kiel, Sec. 10, Charles Harrison Sur., A-95, 5 miles NW Wichita Falls. IPP 96 BOPD, 42°, GOR 200, Strawn 4,192-4,236 ft. TD 5,200 ft.

Wilbarger County: Ada Oil Co. 1 Davis, 3-10-H&TC, 1½ miles SE Odell. IPP 140.8 BOPD, 41°, GOR 565, Canyon sand 4,313-16 ft. TD 4,318 ft.

WEST TEXAS

Andrews County: White Eagle Oil Co. and Lumac Drilling Co. 1 Savage, 17-A36-PSL, 6 miles NW Andrews. IPP 103.5 BOPD, 31.6°, GOR 423, pay 4,316 ft. TD 4,522 ft., elev. 3,182 ft.

Garza County: C. B. Frost, Jr. 1 Lewis, Sec. 1281, BS&F Sur., new pay in PHD field. IPP 110 BOPD, 36°, GOR 250, San Andres pay 3,764-67 ft. TD 3,830 ft.

Pecos County: Vega Corp. 1 Rayner, 68-10-H&GN, 6 miles SW Buena Vista. IPP 15 BOPD, 35°, GOR 325, pay 4,772 ft. TD 4,895 ft.

Scurry County: Forest Oil Corp. 1 Eiland, 167-97-H&TC. IP 208 BOPD, 19/64-in., 42.6°, TP 150 psi., reef 6,848 ft. TD 7,400 ft., elev. 2,321 ft.

SOUTHEAST NEW MEXICO

Lea County: Continental Oil Co. 1 West Anderson Ranch Unit, 6-16s-32e. IP 5,000 M.c.f., plus 443 BOPD, 55.6°, TP 2,940 psi., Pennsylvanian perforations 12,512-30, 12,542-50 ft. TD 14,015 ft., elev. 4,395 ft.

NORTHERN NEW MEXICO

Sandoval County: Fred Turner, Jr. 1 Jicarilla, SW NE NE 32-23n-4w. IPP 28 BOPD, Entrada discovery, new field. TD 4,417 ft. Point Lookout.

WESTERN KENTUCKY

Daviess County: Owensboro Drilling Co. 1 (9) Waitman, SW NE SE 6-P-29. IPP 35 BOPD, Paint Creek 1,574-81 ft. TD 1,784 ft. (Opens North Owensboro field.)

NORTH LOUISIANA

Tensas Parish: Southern Natural Gas Co. 1 Philip Watson, about 3,450 ft. south-southeast of Rowley 1 Adams discovery.

(Continued on page 227)

OIL FIELD

TRUCK BODIES AND TRAILERS ARE FIELD DESIGNED BY LELAND

LELAND "PACKAGED UNIT"
Includes gin-poles, can be mounted with heavy duty winch of your option.

LELAND POLE TRAILERS
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▲ Few oil fielders relish working with a "green hand" . . . and that goes for *truck equipment as well as personnel!* Lots of things happen to truck bodies and trailers when pressed to hard field use—a weak gin-pole pocket . . . faulty structural reinforcement. It may look good on the drawing board, but if the operator says, "no" . . . brother, you've had it! For this reason field men regularly file performance reports on the Leland line of truck bodies, initiating a continuous program of Leland design progress.

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EQUIPMENT COMPANY
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46 BOPD FROM WELL THAT SWABBED DRY

DOWELL XM acid treatment achieved this result by control of silicate swelling

Dowell XM acid is designed to control the swelling of silicates and clay minerals which can occur during the acidizing of some limestone and dolomitic formations. It is used to prevent emulsions, and to give easier return of spent acid and faster well clean-up.

This new well, completed in a dolomitic formation, gave only a show of oil on a drill stem test. An ordinary acid treatment was stopped after 27 hours because of excessive pressure with no break. The well swabbed dry. Then the operator called Dowell.

A study indicated that the effective permeability might have been reduced by swollen silicate materials plugging the pore spaces. Dowell engineers recommended the use of XM acid to reduce this swelling.

Following the treatment the well cleaned up readily and swabbed 252 barrels of oil per day, leveling off at 46 BOPD pumping after five months. The operator gave the Dowell XM acid treatment full credit for the oil well—another well saved from abandonment and given productive life. Latest records show that, since this case, the operator has used Dowell silicate control agents in each of his well treatments in that area with similar records of success.

Other Dowell services including fracturing, Electric Pilot and Glass Gun perforating are also used to solve many difficult problems encountered in oil, gas and water wells. For full details contact your nearest Dowell office or write direct to DOWELL INCORPORATED, Tulsa 1, Oklahoma, Dept. B-11.

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PERSONALS

Parker Turns Tide

Last year's success ratio wipes out troubles of past

ORVILLE H. PARKER, who just moved into a showplace office building in Ponca City, Okla., used his personal drive to turn 13 discouraging years into success.

Just about everything that could happen to Parker did. After those 13 hard years as a drilling contractor, Parker had a blowout in 1949 and a fishing job that left him with nothing but $90,000 in debts.

On the other side of the ledger is 1945's record. Parker drilled 102 wells in southern Kansas and northern Oklahoma. Eighty were producers. He hit with nine of his 23 wildcats. He has 42 oil and gas-producing properties.

He is now shipping drilling equipment to New Brunswick, Canada, where he will apply modern geological, drilling, and fracture techniques to one of the oldest producing areas in North America. The lease contains nearly 10,000,000 acres.

"It may be the birth of a major oil company," Parker says.

The big New Brunswick venture will not slow down his 100-well-per-year drilling pace in the Mid-Continent area.

It comes naturally . . . Parker grew up with oil in his nostrils. In 1908 when he was 7 oil was found near his home in Broken Arrow, Okla. Parker's father became an early-day driller.

His first direct tie with the oil industry came in 1917, when he worked as a pumper during summer vacation to earn money to buy uniforms for Oklahoma A. & M. College preparatory school.

In 1924 he joined Marland Oil Co. in the exploration department. He quit in 1926 to become a salesman of oilfield motor equipment with the Mack Truck and White Motor companies.

Parker quit the job in 1937, determined to go into the oil business for himself. For 3 years he had no income, but finally got backing to form Ingling & Parker, drilling contractors and oil operators. The firm was dissolved in 1943.

Next he formed a drilling company with two men in Kansas City. They fired him in 6 months, and took his two rotary rigs by foreclosing his loan at a bank they controlled.

Parker bought a truck-mounted rotary rig on time, and went to Wyoming to drill water wells for ranchers. Eventually he got enough money to get back into oil drilling.

After his setbacks in 1949, he was far in debt, but rich in experience. He had drilled 600 oil and gas wells.

His assets . . . Perhaps the two things that have contributed most to his success are his ability to make people like him and his drive. Parker is constantly on the go, selling new deals to his associates. He traveled 26,000 miles by air during the first 6 weeks of 1955.

He has no outside interests. "I can't think of anything else I'd rather do," he says. "I'm on vacation 365 days a year."

The 1954 strike . . . Most significant well last year was his gas-distillate discovery on the Hennigh Ranch in Beaver County, Oklahoma. His richest strike was Hilltop field, 6 miles west of Arkansas City, Kans. Parker says it is the biggest discovery in southern Kansas since Rainbow Bend in 1923.

Hilltop was the hunch of Parker's chief geologist, Melvin Endicott, who has been with the firm since graduation from the University of Oklahoma in 1949. Parker now has two other geologists and a geological engineer on his staff.

Until a year ago Mrs. Parker ran the office. Now she confines her activities to entertaining business associates and their wives.

H. D. Teel, former area geologist for Stanolind Oil & Gas Co. at Midland, Tex., has been promoted to district geologist at Lubbock, Tex. He is being replaced at Midland by **John Mason,** a staff geologist in Stanolind's district office at Tyler, Tex.

Alan J. Lowrey, a vice president of Union Oil Co. has retired. Lowrey, who has been associated with Union since 1939, will continue as a director of the firm.

Frank A. Buehler has been named assistant head engineer in the process engineering division of Standard Oil Co. (Ind.) general engineering department. Buehler joined Standard Indiana in 1946.

J. P. Malott has been promoted to the position of manager of the production department by Continental Oil Co. Malott, who had been serving as assistant manager of production, will keep his headquarters at Houston. Malott joined the firm in 1935 at Jal, N. M., as a roustabout.

J. P. MALOTT

M. H. DUBROW

M. H. Dubrow, chief petroleum engineer, has been promoted to the newly created position of chief engineer of the production department. Dubrow, a native Russian, graduated from the New Mexico School of Mines in 1936. He joined Conoco after his graduation as a roustabout at Eunice, N. M.

Max S. Houston has been named to head the newly established exploration office in Denver of El Dorado Refining Co. A former employe of Atlantic Refining Co., Houston, has been serving as a geologist with El Reco in its Wichita offices for the past 3½ years.

O. W. Ward, production superintendent of Tennessee Gas Transmission Co.'s northern division, is being transferred to Fort Worth in conjunction with the shifting of the division's headquarters from Wichita Falls. Other key operating personnel making the move are **J. P. Keating,** division engineer, and **Jess P. Roach,** division geologist. Tennessee's northern division includes North Texas, West Texas, West Central

PERSONALS

Texas, southern Oklahoma, southern Arkansas, New Mexico, and Kansas. The new division office is in the Sinclair Building in Fort Worth.

V. E. Monnett, director of the school of geology at the University of Oklahoma, and **Walter A. Ver Wiebe,** pro-

W. A. VER WIEBE

V. E. MONNETT

fessor of geology at the University of Wichita, have been elected to honorary membership in the American Association of Petroleum Geologists. With the election of Monnett and Ver Wiebe, the A.A.P.G. has elevated only 21 men to honory membership in the organization that totals more than 10,000 members. Monnett, head of the department of geology at the university since 1924, is a charter member of A.A.P.G. Ver Wiebe, who has taught at Cornell University, Ohio State University, and University of Michigan, organized the department of geology at the University of Wichita in 1927. He served as chairman of the department until his retirement in 1953. Honorary membership in the society is awarded for distinguished service in petroleum geology. The men will be given the certificates and gold membership cards on March 29 at A.A.P.G.'s annual meeting in New York.

Sydney S. Smith, retired manager of products pipelines for Shell Oil Co., has opened consultant offices in New York City.

Richard A. Morse has been named associate director of Gulf Research & Development Co. Morse will have administrative direction of research concerning drilling, production, and transportation. Before joining Gulf, Morse was with the research department of Stanolind Oil & Gas Co.

Dr. P. E. Kent, senior geologist with British Petroleum Co., Ltd., has been awarded the Bigsby Medal for contributions to the paleogeography and stratigraphy of England and Wales, and his researches in Central Africa and Iran. The Bigsby Medal was founded by Dr. J. J. Bigsby, a Canadian geologist who died in the late 19th century. It was first awarded in 1877 and has been given every other year since then. The recipient must not be older than 45.

Walter S. Hallanan, president of Plymouth Oil Co. and chairman of the National Petroleum Council since its beginning in 1946, has been named to receive the annual recognition award of the Texas Independent Producers and Royalty Owners Association. Hallanan was honored for his fight against imports, federal control of natural-gas production, and compulsory unitization.

Joseph M. Wilson has been appointed assistant superintendent of Shell Oil Co.'s Wilmington-Dominguez (Calif.) refineries. Wilson, who has more than 26 years of service with Shell, replaces **G. A. Lorenz,** who has transferred to Shell Oil Co. of Canada, Ltd., as superintendent of the Montreal refinery. Wilson had been serving as superintendent in charge of lubricating oils at Shell's Wood River, Ill., refinery before his promotion.

J. M. WILSON

W. Truett Hollis, production superintendent for El Paso Natural Gas Co.'s San Juan division at Farmington, N. M., has been promoted to manager of drilling operations for the entire company.

Dean C. Wellman has been named Rocky Mountain area manager of Arrowhead Exploration Co. Wellman, a veteran of 17 years in the oil industry, has served with Pure Oil Co., and most recently head of the exploration program in the Rockies for Derby Oil Co. Arrowhead, a branch of McKnight Enterprises, of St. Paul, will be an independent affiliate of two other McKnight companies, LaGorce Oil Co. and Mendota Oil Co., both of Fort Worth.

J. L. Cooley, vice president and director of California Research Corp., a subsidiary of Standard Oil Co. of California, has been reappointed to the Subcommittee on Aircraft Fuels of the National Advisory Committee for Aeronautics.

Colin C. Rae, assistant to the president of Skelly Oil Co., has retired. Rae completed 42 years of service as geologist, petroleum engineer, and executive with various oil companies in California, Wyoming, and the Mid-Continent areas. His research contributed to the discovery of gas and oil in the Big Sand Draw field of Wyoming.

F. J. Pettijohn, professor of geology at Johns Hopkins University in Baltimore, will become president of the Society of Economic Paleontologists and Mineralogists on March 31. Pettijohn will take over the direction of the 1,100-member society at the close of the twenty-ninth annual meeting of the group at the Statler Hotel in New York City, March 28-31. Serving with Pettijohn on the 1955-56 council will be **Hans Thalmann,** Stanford University, Palo Alto, Calif., first past president; **Harold N. Fisk,** Humble Oil & Refining Co., Houston, second past president; **Robert R. Shrock,** professor of geology at Massachusetts Institute of Technology, Cambridge, vice president; and **Samuel P. Ellison, Jr.,** professor of geology at University of Texas, Austin, secretary-treasurer. Named editors of the society's two publications are **A. K. Miller,** professor of geology, and **W. M. Furnish,** associate professor of geology at the University of Iowa, co-editors of the Journal of Paleontology; and **Jack L. Hough** and **Ralph E. Brim,** both of the University of Illinois, editor and acting editor of the Journal of Sedimentary Petrology.

Hobart G. Mariner has been promoted to maintenance superintendent of Service Pipe Line Co. Mariner, former manager of the company's Missouri division, succeeds **E. A. Slade,** who resigned January 15. Mariner joined Service in 1940 as a draftsman and instrument man. **Harry C. Jones**, former manager of the company's Nebraska

H. G. MARINER

HARRY C. JONES

division, has been named to succeed Mariner as manager of the Missouri division. Jones started with Service as a timekeeper in 1916 and has served at every level of field management since then.

PERSONALS

Thomas F. Taylor has been named vice president of Grace Oil Co., Houston. Taylor, a graduate of the University of Texas, was a geologist with Pan American Production Co. at Houston for 3 years and later was with Dow Chemical Co. For the past 3 years he has been an independent consultant.

Edward W. Isom, chairman of the board of Sinclair Research Laboratories, Inc., and officer and director of other Sinclair companies, has retired. Isom, who joined the Sinclair organization at its birth on May 1, 1916, will continue to serve as a consultant. Isom first served with Sinclair as vice president in charge of new construction and operation of refineries. In 1923, he was made vice president in charge of research and development.

R. B. Gilmore, vice president in charge of Mid-Continent operations for DeGolyer & MacNaughton, Dallas, was installed as chairman of the Petroleum Branch of American Institute of Mining and Metallurgical Engineers February 16. He succeeds **John R. McMillan,** vice president of Monterey Oil Co., Los Angeles. Gilmore, a 1939 graduate of the University of Tulsa, has been with DeGolyer & MacNaughton since 1941. Other officers of the A.I.M.E. who will take office at Chicago are **Phil J. Lehnhard,** field chairman of the East Texas Engineering Association, Kilgore, vice chairman; **G. Latham Yates,** Amstutz & Yates, Inc., Wichita, vice chairman. Elected to the petroleum branch executive committee were **Earl M. Kipp, Jr.,** The California Co., New Orleans; and **George R. Gray,** Bariod Sales Division, National Lead Co., Houston.

L. O. Lord, acting superintendent of Shell Oil Co.'s two natural-gasoline plants near Denver City, Tex., since June 1954, has been transferred to Midland, Tex., as superintendent of operations. At Midland, he will supervise operation of the two Wasson plants near Denver City and the Shell-operated TXL gasoline plant at Notrees. **D. A. Nicewander,** former assistant superintendent of the Wasson plants, will replace Lord as superintendent. **W. A. Ellexson,** former assistant superintendent at the TXL plant, will fill Nicewander's former position.

James W. Graham, Jr., has been promoted to gas engineer in the Tulsa office of Kewanee Oil Co. Graham, who joined Kewanee as district engineer at Pampa, Tex., in 1949, had been serving as division engineer in the Panhandle.

Paul G. Blazer, chairman of the board of Ashland Oil & Refining Co., has been voted "Kentuckian of the year" for 1954 by the Kentucky Press Association. Blazer came to Kentucky in 1919 and assisted in organizing the Great Southern Refining Co. in Lexington before moving to Ashland to organize Ashland Refining.

John E. Blixt, former senior geologist with The Texas Co. in the Rocky Mountain area, has joined Halbert & Jennings Co. Blixt, a 20-year veteran with Texaco, will aid in the company's oil and uranium development program.

H. W. Branum, engineer for Continental Pipe Line Co.'s North Texas district, has been named superintendent of Pioneer Pipe Line Co., of Salt Lake City.

LeRoy J. Conn has resigned as district geologist for Pure Oil Co. in Fort Worth to become head of exploration for LaGorce Oil Co. in Fort Worth. **M. H. L. Keener,** acting head of Pure's geological development section in Fort Worth, will replace Conn as district geologist, and **Donald R. Raney** will take over as acting head of the geological development section.

DEATHS

William DeWitt Waltman, 80, pioneer oil executive, died at his home in Los Angeles, February 14, after a lingering illness from a heart condition. He entered the oil business in 1912 as superintendent of field operations for Franco Wyoming Oil Co. in the old Salt Creek field of Wyoming. He later became a vice president and director of the firm. Waltman also served as president of McElroy Ranch Co.

Neil Stallard, 56, pipeline field superintendent for Pelican Crude, Inc., Lake Charles, La., died recently after suffering a heart attack at his home near Lake Charles. Stallard began his oil career in 1916 with the old Prairie Pipe Line Co. at Independence. He later served with Continental Oil Co. as district superintendent in the Rio Grande Valley of Texas, Lake Charles, and Ponca City, Okla.

Edward L. (Ted) McCollough, 23, geologist with Hunt Oil Co., was killed February 15 when his car and a truck collided head on a mile west of Roscoe, Tex. He was en route to Midland from a well site in Nolan County when the crash occurred about 6 a.m. McCollough was the son of E. H. McCollough, Tulsa, executive vice president and general manager of Amerada Petroleum Corp.

Buford Williams, 63, veteran Oklahoma oil man, died recently in Oklahoma City after a 4-year illness. Williams was owner of the Buford Williams Corp. in Oklahoma City.

Edwin R. Lloyd, 72, widely known geologist, died February 14 at his home in Midland, Tex. He was an active member of the American Association of Petroleum Geologists and was made a life member several years ago. Lloyd was a consulting geologist until he retired 1 year ago. Before entering consulting he had been associated with various oil companies including Sinclair Oil & Gas Co., Mid-Kansas Oil & Gas Co., Argo Oil Co., and Roxana Petroleum Corp.

Dr. George M. Lees, 56, former chief geologist of British Petroleum Co., Ltd., died recently in London. Dr. Lees was an authority on Middle East geology. He received various professional honors among them the Sidney Powers Memorial Medal of the American Association of Petroleum Geologists. Lees had retired from British Petroleum in 1953.

Walter A. Scott, 60, district sales manager at Houston for American Manufacturing Co. of Texas, died there February 11. A native of West Virginia and widely known as "Scotty," he had worked in various parts of the oil-field business for more than 40 years in West Virginia, Pennsylvania, Ohio, and Texas.

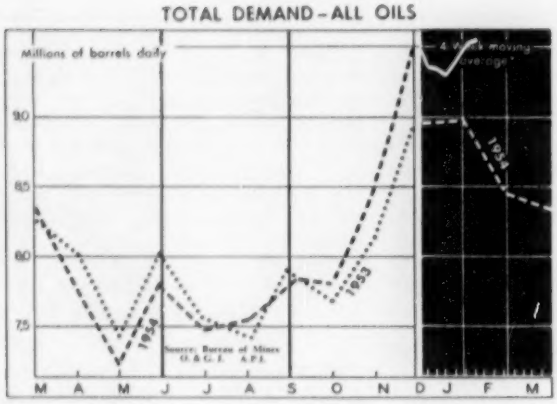
Morris Price Macmillan, 74, prominent oil man and vice president in charge of production for Macmillan Petroleum Corp., Los Angeles, for 30 years, died February 12 after an illness of several months. Macmillan moved to southern California in 1924 and helped develop the Signal Hill oil field.

Latest Figures . . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,748,450	UP	9,350	UP	363,060
Crude stocks	260,144,000	UP	442,000	DOWN	7,752,000
Completions	892	DOWN	155	DOWN	147
Refinery runs	7,384,000	DOWN	34,000	UP	354,000
Gasoline stocks	174,203,000	UP	2,872,000	UP	186,000
Distillate stocks	76,158,000	DOWN	5,657,000	UP	2,901,000
Four-product stocks	318,488,000	DOWN	5,628,000	UP	5,639,000
Total imports	1,349,000	UP	51,100	UP	266,700

TOTAL DEMAND – ALL OILS



Gasoline Stocks Have Been Climbing Too Much Since the End of the Year

GASOLINE inventories are only a few million barrels above last year. The fact that this excess over the previous year is much less than it was last summer may tend to cloud the actual gasoline stock picture.

Weekly reports near the end of December were showing a decrease for gasoline stocks compared with the same weeks of 1953. This improved position lasted only through the first few weeks of January. Stocks for the last 2 weeks of January and for the first week of February were running above last year by about a million barrels.

Last year's gasoline-stock levels would be too high even for this year. At the end of January 1954, finished and unfinished gasoline stocks amounted to 171,704,000 bbl. or 15.0 per cent greater than at the end of January 1953. Compared with 1952, gasoline stocks were up 19.0 per cent.

Total demand for gasoline in 1954 was only 2.1 per cent greater than in 1953 and 6.7 per cent more than in 1952. Gasoline demand is forecast at 3,598,000 bbl. daily for 1955 for an increase of 10.3 per cent over 1952. In contrast, gasoline stocks at the end of January were at least 19 per cent greater than in 1952.

Even if gasoline inventories are held down so that stocks at the end of March are no higher than last year, the percentage increase in stocks over 1952 will be larger than the expected increase in demand. Gasoline stocks were near normal in 1952 until the big reduction during the refinery strike in May of that year.

Stock trends of past years indicate that gasoline stocks at the end of March will be higher than last year. End-of-March gasoline stocks have been higher every year since 1944, and the drop in that year was due to abnormal war conditions.

If gasoline stocks at the end of March are as much as 8,000,000 bbl. above last year the pressure on gasoline markets may be enough to prevent a return to normal prices during the gasoline season. The low of the Group 3 spot market for gasoline is the same as at the end of 1947 or 10.25 cents a gallon for regular.

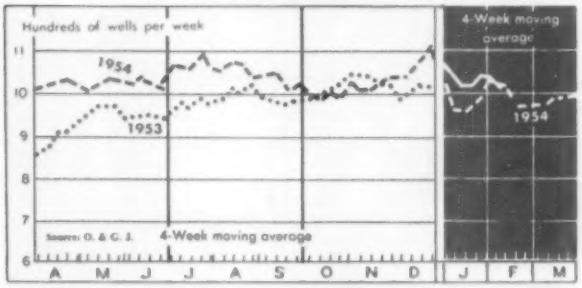
The Group 3 low for regular went to 11.375 cents a gallon for a short period after the crude-price increase in June 1953. There is little chance that regular gasoline will go back to 11.375 cents this summer unless some of the pressure from excessive stocks is removed. Such a program would call for a greater shift in refinery yields from gasoline to distillate for the remainder of the heating season.

Since heating-oil demand will soon start its seasonal decline, any shift to higher percentage yields of distillate fuels would call for a reduction in refinery runs.

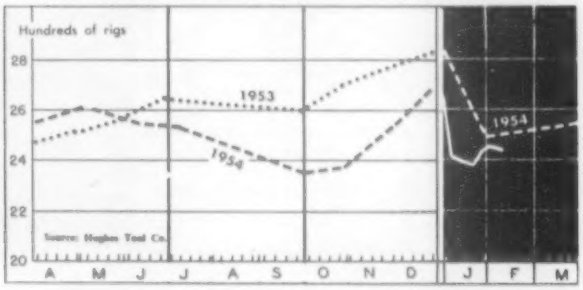
Weather helps heating oils . . . The cooler weather in the heating-oil areas of the East Coast added strength to the distillate markets. However, the end-of-the-season shift in interest tended to prevent any increase in quoted prices. It now would take a definite shortage of burning oils to raise distillate prices this season.

The slight drop in distillate prices on the Group 3 market in the first week of February was due to some material forced on the market by demurrage charges on the pipeline. This material has been sold. The market has gained strength, but prices have not gone up.

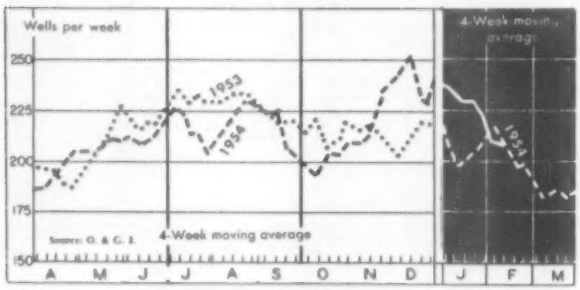
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS*

Area—	2-14-55	Change from 2-7-55	Change from 2-15-54
Gulf Coast	519	—10	2
N. and W. Texas-New Mexico	824	7	37
Arkansas-N. Louisiana-E. Texas	171	1	— 11
Oklahoma	295	— 4	—115
Kansas-S. Nebraska	168	— 2	20
Illinois-Eastern	123	— 9	7
Rocky Mountain	194	—14	— 47
Pacific Coast	141	1	— 6
Total United States	2,435	—30	—113
Western Canada	195	—10	57

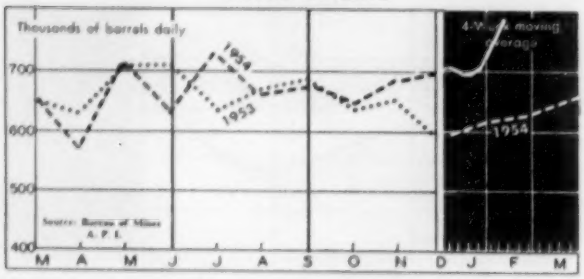
*Hughes Tool Co.

WEEKLY WELL COMPLETIONS . . .WEEK ENDED FEBRUARY 12, 1955

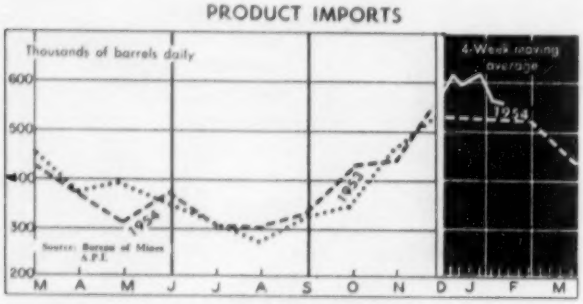
	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1955				
	Comp.	Oil	Gas	Dry	Footage	1955	1954	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	4	0	0	4	20,656	16	14	0	0	0	4	4	0	0	0	15	15
Arkansas	6	3	0	3	14,861	50	61	0	0	0	1	1	4	0	0	11	15
California	39	35	0	4	182,367	221	292	1	0	0	4	5	3	0	1	39	43
Colorado	23	4	0	19	122,275	148	122	1	0	0	14	15	7	0	4	76	87
Illinois	72	37	0	35	174,602	473	326	0	0	0	10	10	10	0	0	54	64
Indiana	7	2	1	4	14,772	67	101	0	0	0	2	2	2	0	0	18	20
Kansas	80	41	8	31	277,896	575	479	2	0	1	10	13	14	0	4	102	120
Kentucky	27	13	4	10	43,392	152	124	1	0	0	4	5	7	0	1	25	33
Louisiana	59	41	6	12	404,624	438	376	3	0	0	5	8	16	6	4	41	67
North	22	17	0	5	62,815	238	188	1	0	0	3	4	3	2	1	18	24
South	37	24	6	7	341,809	200	188	2	0	0	2	4	13	4	3	23	43
Michigan	11	4	0	7	31,298	78	85	0	0	0	3	3	1	0	0	32	33
Mississippi	10	4	0	6	79,674	45	33	0	0	0	6	6	0	0	0	18	18
Montana	9	3	0	6	47,441	46	28	0	0	0	3	3	1	0	0	12	13
Nebraska	10	3	0	7	52,001	69	45	0	0	0	7	7	4	0	0	35	39
New Mexico	20	14	2	4	114,252	127	171	1	1	0	1	3	1	1	0	12	14
Northwest	3	1	1	1	9,858	38	52	1	0	0	0	1	1	0	0	3	4
Southeast	17	13	1	3	104,394	89	119	0	1	0	1	2	0	1	0	9	10
North Dakota	5	5	0	0	43,177	24	27	0	0	0	0	0	0	0	0	4	4
Ohio	0	0	0	0	0	127	106	0	0	0	0	0	0	0	2	5	7
Oklahoma	125	82	4	*39	507,463	864	1,079	2	0	1	9	12	16	2	3	71	92
Pennsylvania-New York	35	10	9	†16	90,159	207	297	0	0	1	3	4	0	0	4	3	7
Texas	327	189	11	127	1,562,537	2,147	2,075	14	5	1	78	98	87	10	13	442	552
Southwest (1 & 4)	59	32	1	26	260,025	333	295	1	3	0	16	20	14	4	3	69	90
Gulf Coast (2 & 3)	47	23	3	21	304,275	301	323	1	2	1	15	19	7	6	8	82	103
East (5 & 6)	16	8	4	4	86,555	142	80	1	0	0	2	3	6	0	0	39	45
North Central (7-B & 9)	100	46	1	53	356,491	670	783	7	0	0	28	35	42	0	0	157	199
West (7-C & 8)	88	65	1	22	493,808	573	489	4	0	0	16	20	18	0	1	92	111
Panhandle (10)	17	15	1	1	61,383	128	105	0	0	0	1	1	0	0	1	3	4
Utah	0	0	0	0	0	5	8	0	0	0	0	0	0	0	0	4	4
West Virginia	10	1	3	6	35,100	79	60	0	0	0	3	3	0	0	2	3	5
Wyoming	13	7	1	5	44,971	110	184	0	0	0	1	1	1	0	1	25	27
Miscellaneous	0	0	0	0	0	5	6	0	0	0	0	0	0	0	0	5	5
Total United States	**892**	498	49	345	3,863,518	6,073	6,099	25	6	4	168	**203**	174	19	39	1,052	1,284
Total previous week	1,047	605	86	356	4,143,406			40	2	2	154	198	149	13	35	884	1,081
Total February 13, 1954	1,039	585	56	398	4,208,803			21	5	1	188	215	172	21	38	1,115	1,346

Service wells included: *5, †7.

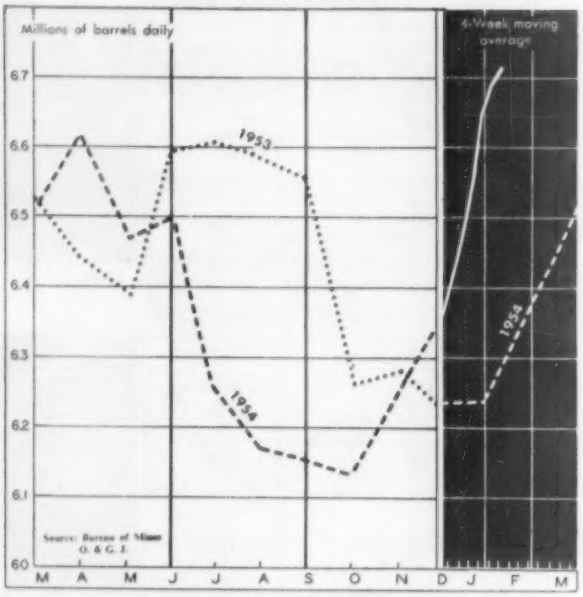
CRUDE IMPORTS



PRODUCT IMPORTS



CRUDE-OIL PRODUCTION

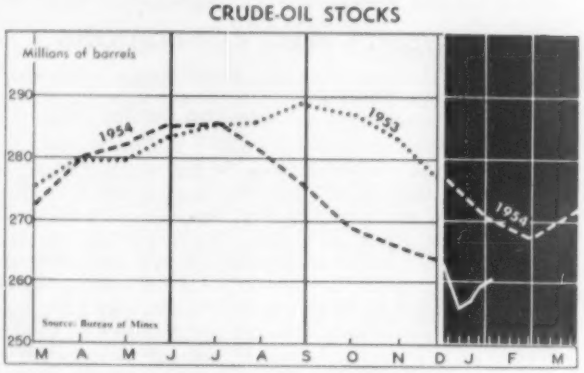


DAILY AVERAGE PRODUCTION FOR WEEK

	February 12			Feb. 5
	Crude oil	Lease condensate	Total	total
Alabama	4,200		4,200	4,200
Arkansas	74,450	500	74,950	74,700
California	967,400		967,400	965,600
Colorado	143,700		143,700	140,100
Eastern	51,900		51,900	51,900
Florida	1,450		1,450	1,450
Illinois	207,100		207,100	206,300
Indiana	30,200		30,200	30,300
Kansas	329,200		329,200	332,700
Kentucky	40,700		40,700	40,900
Louisiana	650,150	55,950	706,100	700,600
North	106,150	2,950	109,100	108,750
South	544,000	53,000	597,000	591,850
Michigan	31,800		31,800	32,900
Mississippi	90,850	4,025	94,875	94,700
Montana	43,200		43,200	40,900
Nebraska	26,900		26,900	26,500
New Mexico	218,900	4,075	222,975	220,900
North Dakota	29,700		29,700	28,800
Oklahoma	532,800		532,800	543,900
Texas	2,880,500	53,300	2,933,800	2,925,450
Dist. 1	49,500	500	50,000	48,500
Dist. 2	149,000	8,100	157,100	157,100
Dist. 3	450,000	25,075	475,075	473,675
Dist. 4	252,000	6,075	258,075	258,075
Dist. 5	47,500	550	48,050	49,425
Dist. 6	123,500	5,600	129,100	129,175
East Texas field	236,000		236,000	237,925
Dist. 7-B	140,000	50	140,050	140,400
Dist. 7-C	183,000	4,700	187,700	186,250
Dist. 8	970,000	2,000	972,000	966,850
Dist. 9	194,000	575	194,575	192,425
Dist. 10	86,000	75	86,075	85,650
Utah	4,000		4,000	4,100
Wyoming	271,200		271,200	271,800
Others	‡300		‡300	‡400
Total U. S.	6,630,600	117,850	**6,748,450**	6,739,100
Change from previous week, up			**9,350**	
Canada	†300,975		†300,975	†293,550
Total U. S. production January 1-February 12			286,800,100 bbl.	
Same period last year (crude plus cond.)			*270,019,145 bbl.	

*Includes 4,326,975 bbl. condensate. †Week ended previous Monday. ‡S. D. 100, Nev. 200.

CRUDE-OIL STOCKS



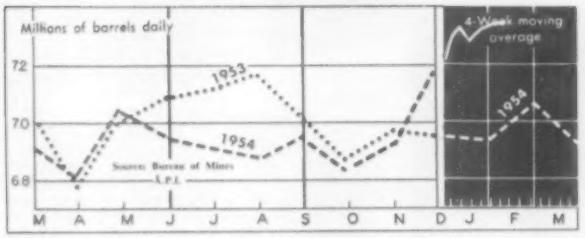
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

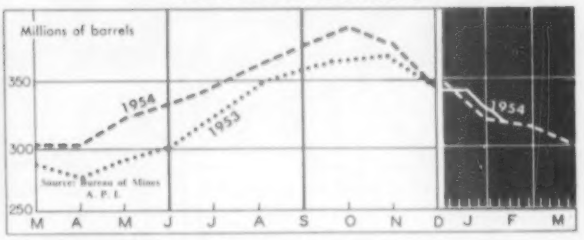
	Feb. 5, '55	Jan. 29, '55	Feb. 6, '54
Pennsylvania Grade	2,942	2,961	2,629
Other Appalachian	1,731	1,787	1,611
Illinois, Indiana, Michigan	11,105	11,263	12,452
Nebraska, North Dakota	2,123	2,029	(‡)
Kansas	8,359	8,233	9,955
Oklahoma	24,011	23,808	26,913
Arkansas	3,071	3,226	3,328
Louisiana	14,941	15,057	14,947
North	2,463	2,400	2,626
South	12,478	12,657	12,321
Mississippi	3,205	3,068	3,447
New Mexico	7,980	8,004	8,319
Texas	118,029	118,003	123,451
East Texas proper	9,941	10,133	11,319
West Texas	51,302	50,939	52,870
Texas Gulf	23,793	24,323	25,761
Other Texas	32,993	32,608	33,501
Wyoming	14,641	14,678	13,535
Other Rocky Mountain	5,659	5,936	3,173
California	31,414	31,030	33,394
Foreign	†10,933	10,619	10,742
Total	260,144	259,702	267,896

*Bureau of Mines. †Includes 3,228,000 bbl. in California. ‡Included with Kansas.

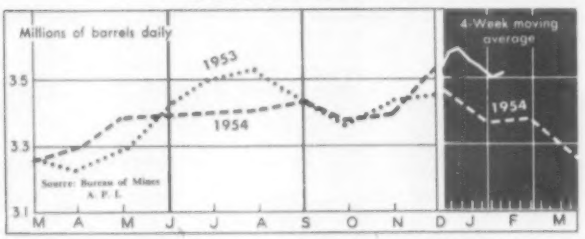
REFINERY RUNS



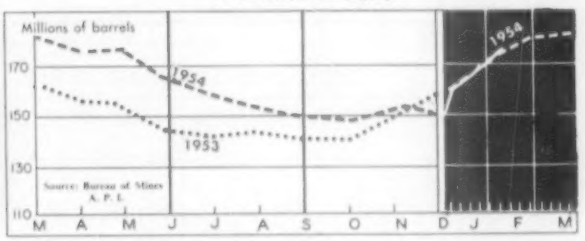
FOUR-PRODUCT STOCKS



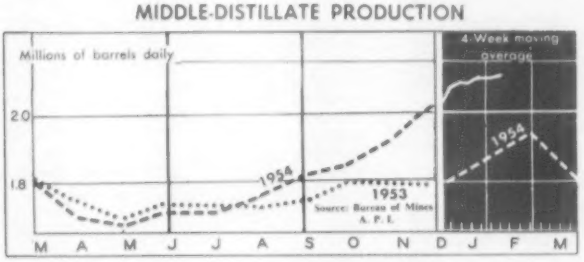
GASOLINE PRODUCTION



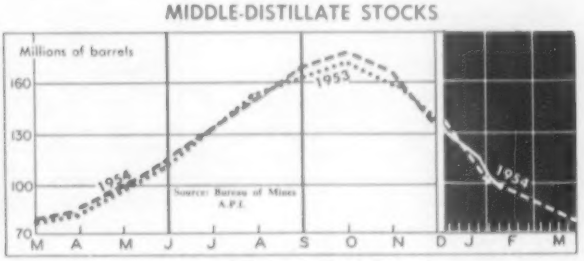
GASOLINE STOCKS



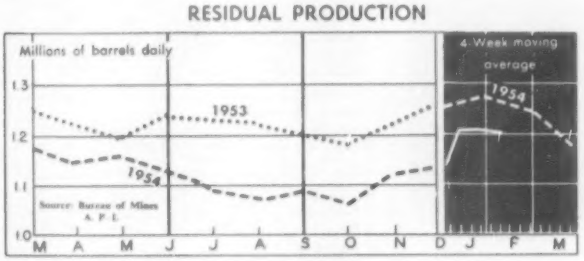
MIDDLE-DISTILLATE PRODUCTION



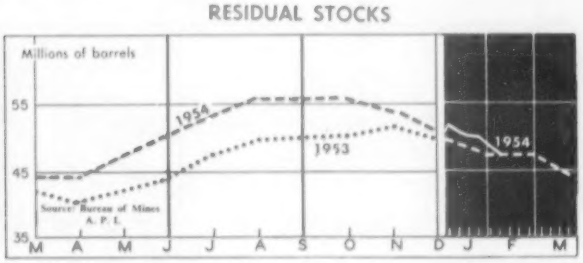
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, FEBRUARY 11

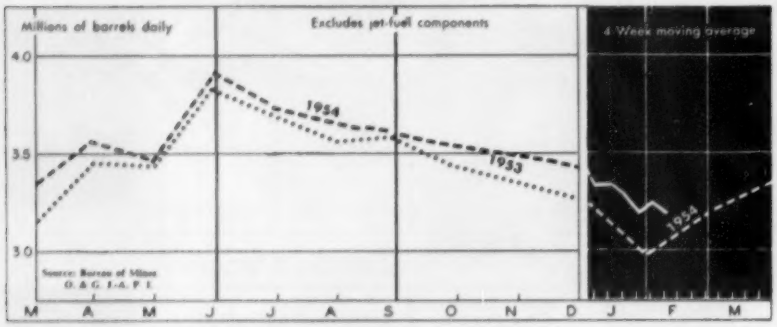
(Excludes all jet-fuel components)

(Thousands of barrels)

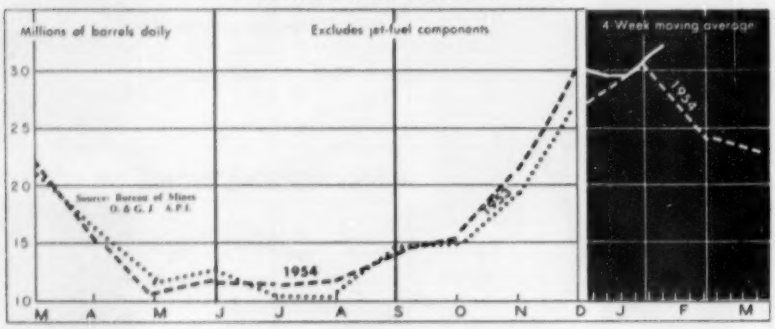
District—	Daily avg. runs	Daily average production — Gaso.*	Kero.	Dist.	Resid.	Stocks‡ — Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, February 1954 — Daily avg. runs	Daily average production — Gaso.*	Kero.	Dist.	Resid.
East Coast	1,090	426.4	36.0	305.0	277.0	35,003	8,434	26,330	7,967	1,017	412.2	46.1	265.9	231.2
Appalachian:														
District 1	93	41.0	5.1	22.4	7.7	4,860	514	1,654	399	117	52.6	5.9	28.2	15.7
District 2	110	58.4	9.1	21.6	17.3	2,426	290	603	225	96	50.7	6.8	18.7	15.9
Ind., Ill., Ky.	1,376	707.1	85.2	296.3	179.6	39,081	5,650	12,861	2,886	1,334	701.9	83.9	264.5	192.7
Okla., Kans., Mo.	659	380.7	17.2	163.8	46.4	18,136	1,334	8,708	1,201	594	346.2	16.9	139.1	46.2
Inland Texas	256	175.7	8.3	42.0	21.7	6,509	300	1,180	1,291	251	175.6	12.5	42.0	29.3
Texas Gulf Coast	1,793	866.2	129.7	535.0	237.3	24,304	2,421	8,244	4,347	1,701	741.4	140.7	410.1	227.6
La. Gulf Coast	620	319.0	68.4	140.1	35.6	11,199	1,484	2,724	1,238	581	269.8	80.1	149.3	45.7
N. La. and Ark.	88	34.9	8.7	21.0	6.7	4,495	447	1,268	169	87	36.9	8.6	19.7	7.1
Rocky Mountain:														
New Mexico	17	10.0	1.0	2.9	2.7	178		85	29	19	11.9	.7	3.1	2.9
Other Rocky Mtn.	261	121.4	3.9	61.9	41.7	7,460	200	2,020	802	245	125.7	4.6	55.8	43.0
California	1,021	460.3		182.4	363.9	20,552	364	10,481	26,135	1,026	440.5	5.4	148.5	383.9
Feb. 11, 1955	7,384	3,601.1	372.6	1,794.4	1,237.6	174,203	21,438	76,158	46,689	7,068	3,365.4	412.2	1,544.9	1,241.2
Feb. 4, 1955	7,418	3,458.3	386.7	1,791.2	1,207.4	171,331	23,200	§81,815	§47,530					
Feb. 13, 1954	7,030	3,404.8	383.6	1,519.4	1,214.1	174,017	19,654	73,257	45,921					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipelines. §Revised.

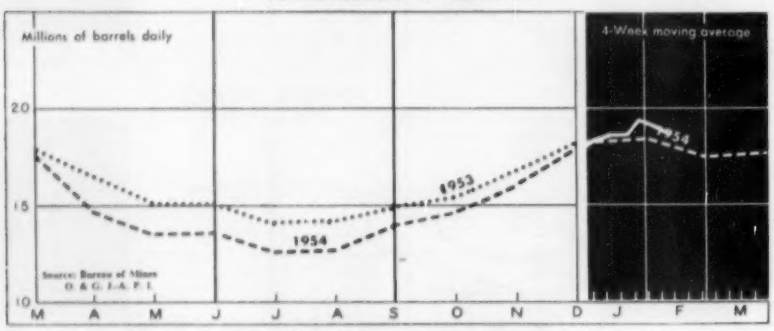
TOTAL GASOLINE DEMAND


Millions of barrels daily
Excludes jet-fuel components
4-Week moving average
1954
1953
1954
Source: Bureau of Mines
O. & G. J.-A. P. I.
M A M J J A S O N D J F M

TOTAL MIDDLE-DISTILLATE DEMAND


Millions of barrels daily
Excludes jet-fuel components
4-Week moving average
1954
1953
1954
Source: Bureau of Mines
O. & G. J.-A. P. I.
M A M J J A S O N D J F M

TOTAL RESIDUAL DEMAND



REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of February 16, 1955. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.25-11	11.25-12	10.50-10.75
Premium gasoline	11.25-12	13-13.75	11.50-11.75
42-44 w.w. kerosine	9.625-9.875	10.7	9.5-9.75
No. 2 straw fuel oil	8.75-9.0	9.95	9.0-9.25
No. 6 residual	$1.50-1.60	$2.35-2.45	$1.95-2.00

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.0	4.5	4.75
Grade 18-55	6.0	5.5	5.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	13.25

WAX

Mid-Continent

132-134 A.M.P.	6.0

• Higher prices for residual fuel on the Gulf Coast have not been reflected in increases on the East Coast. Pipeline demurrage charges pushed down Group 3 distillate prices early in February. It will take some very cold weather to move prices back. Residual is very firm in the Mid-Continent.

PRODUCTION AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 2-11-55	3,515	3,185
November 1954	3,428	3,505
January 1954	3,354	2,985
February 1954	3,365	3,182
Middle distillate:		
Four weeks ended 2-11-55	2,141	3,232
November 1954	1,976	2,246
January 1954	1,857	3,076
February 1954	1,957	2,417
Residual fuel:		
Four weeks ended 2-11-55	1,201	1,887
November 1954	1,120	1,613
January 1954	1,271	1,831
February 1954	1,241	1,753

SUPPLY AND DEMAND*

(Thousands of barrels daily)

	Nov. 1954	Nov. 1953
Domestic demand	8,247	7,737
Gasoline	3,413	3,225
Kerosine	425	383
Distillate	1,709	1,461
Residual	1,536	1,576
Jet fuel	136	105
Lubricants	103	107
L.P.G.	366	356
Other products	513	487
Crude loss	46	37
Exports	377	380
Gasoline	92	110
Kerosine	15	19
Distillate	97	77
Residual	77	78
Jet fuel		
Lubricants	36	41
L.P.G.	10	7
Other products	15	13
Crude	35	35
Total demand	8,624	8,117
Gasoline	3,505	3,335
Kerosine	440	402
Distillate	1,806	1,538
Residual	1,613	1,654
Jet fuel	136	105
Lubricants	139	148
L.P.G.	376	363
Other products	528	500
Crude exp. and loss	81	72
Stock change	—450	— 36
Crude	— 94	—151
Products	—356	115
New supply	8,174	8,081
Imports	1,104	1,120
Crude	636	648
Products	468	472
Production	7,070	6,961
Crude	6,346	6,277
Natural gasoline, etc	724	684
Runs to stills	6,975	6,987

*Bureau of Mines.

(The schedule of selected crude prices appeared on page 215 of the February 14 issue and will be printed again next week.)

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

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Address Classified Advertising Material: The Oil and Gas Journal, P. O Box 1260, Tulsa 1, Okla.

FOR SALE EQUIPMENT

SALES AND RENTALS of Rotary and Cable tools. E. A. Kelly, Okla. City, 3125 S. E. 29th St. Box 861. JA 5-6407.

FOR SALE: 3600' 4½" extra hole drill pipe, good for shallow drilling, $.90 per foot. Terms. Melton Supply Company, Box 1360, Seminole, Okla.

CORE DRILLS-URANIUM. Power core drills for all depths. New and used spudders, rotaries, well drilling equipment and supplies. Compressors for air operation. Pressey & Son, Pueblo, Colo.

FOR SALE—In Oklahoma City field one 30' x 86' x 12' sectional steel corrugated iron building, $1,750.00; one 30' x 40' x 10' DO., $750.00, both now erected. Contact T. P. Mace, Oklahoma City warehouse or Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE: 1—Beaird—Ingersoll-Rand packaged Compressor Plant, Type 8-JVG (165 H.P.) Heavy Duty, direct connected, 4-cycle, gas engine driven, single stage equipped with 3—4¼ x 9 compressor cylinders, three hand operated fixed volume pockets, two hand operated valve lifters, 20" O.D. 500# W.P. intake scrubber, air starting equipment and controls for automatic operation. Designed for intake pressure range 100# 250#, discharge pressure range 500#-600#. Delivery 3,480 MCF per day at 250# intake, 550# discharge. This plant has been in use less than 30 days and is located near Palestine, Texas. Box H-616, The Oil and Gas Journal, Tulsa, Oklahoma.

7" OD 10 V thd. Rge. 2, SS Casing, 7519.53' of 24 lb. Grade D long cplgs., and 4443.75' of 26 lb. Grade C. Pulled from Major Company wells Rodessa Field. All No. 1 and cold water tested for 3000 lbs. Stored in Kilgore, Texas. Priced at $1.35 per ft., take all. Contact PHILIP B. BERRY, Box 642, Tyler, Texas. Ph. 2-2301.

USED EQUIPMENT

Two Franks Model 4000-TM Single Drum Well Servicing Units. Single Pole Mast. Truck Mounted.
Franks Model Super East Texas Single Drum Well Servicing Unit. Truck Mounted. Handles 6500' work.
Franks Model East Texas Single Drum Well Servicing Unit. Single Pole Mast. Truck Mounted. Handles 4000' work.
Two Cardwell Models K5 Single Drum Well Servicing Unit. Single Pole Mast. Industrial engine. Mounted on trucks.

50, 60 Ideco Skid Servicing Unit. Double Pole Mast. Mounted on International Tandem Truck.
Franks SAL 4500 Skid Rotary Rig Cummins Power, 96' Derrick. Located, Tulsa, Oklahoma.
O.C.S. Type 5 Servicing Unit mounted on 1942 Mack Truck. Located Odessa, Texas.

Write, Wire or Call

FRANKS MFG. CORPORATION
BOX 3218, WHITTIER STATION
TULSA, OKLAHOMA

FOR SALE EQUIPMENT

ONE 36-L Bucyrus-Erie Spudder with clean-out tools. Phone 982, Augusta, Kansas.

GAS COMPRESSORS: Twin Clarks, Twin Bessemers, Twin Coopers, Angle Type units. Compressor Cylinders, Alfred B. Kern, 227 Wright Building, Tulsa 3, Oklahoma.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: At Tallant, Oklahoma, two 5' x 56' absorbers, 20 trays, 24" spacing 500# WP, peak design each 40,000 MCFD at 350 PSIG; oil rate 100-300 GPM, Min. and Max. Bought new 1947, taken out of service 1954. Price $8500.00 each, with fittings, standing. Full data upon request. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

GOOD #1 GRADE USED 8" LINE PIPE FOR LESS!

Save almost ½ the cost of new pipe.

Lapweld 8⅝" O.D. 28.55 used pipe. Straight single random lengths. Machine cleaned. Plain and bevelled or screw end. 850 to 900 PSI. Pipe located in Illinois. Will sell for cash, or will finance meritorious propositions.

REDNEB PIPE CO.
P. O. Box 1798, Shreveport, La., Phone 2-3276.

FOR SALE

Complete and modern refinery, either in whole or by units, as follows:

1. 6000 bbl. topping plant with Dubbs upshot heater. Two 8x50 fractionators, salt settlers, pumps, instruments, etc., for complete operation.
2. One Dubbs cracking unit complete with 2 coil upshot heater, reaction chamber.
3. One complete steam generating unit, consisting of 2 Springfield wt boilers, feed pumps, burners, fans, stock and instruments ready to operate; boilers 415 HP each.
4. Miscellaneous items connected with refinery operation; such as, pumps, tanks, vessels, fire equipment, etc.

CONTACT

W. T. Waggoner Estate,
Electra, Texas
J. O. WALKUP—Phone 3-225.

FOR SALE EQUIPMENT

WALKER-NEER 32 SPC. Complete with tools for top to bottom drilling, new lines, all in good condition. Call 96-92240 or write Wm. H. Bass R.R. 9, Jennings Lane, Evansville, Ind.

FOR SALE—At Oklahoma City 1 HB-218 125# MWP Coynco Stratube open cooling sections with 1" OD x 18 BWG x 20' long Admiralty metal tubes. Purchased new March, 1951, out of service September 1, 1954. Price $850.00. Used for absorption oil cooling. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

Stop Tong Breakage!
ARMITE DRILL COLLAR & TOOL JOINT COMPOUND
ARMITE LABS., 6809 Broad St., Los Angeles 1, Calif
Petro. Industries Consultants, C.A. Caracas, Venez.

GASOLINE PLANT *FOR SALE*

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Adequate storage tanks for all products. Drum Lead Blending Plant. Detailed inventory available upon request.

SOUTHERN PRODUCTION CO., INC.
P. O. Box 670, Ft. Worth, Texas

IMMEDIATELY AVAILABLE

BOILERS—(9) 304 HP, 125 PSI, Kewanee, Firebox, ASME. Complete, (1) 50 HP, 150 PSI, Titusville.

COLUMNS—Steel, welded, w/Reboilers & Reflux Condensers—18'x41', 20"x44', 24"x45', 42"x44'.

11'x84' bubble cap, 18 trays, 100 PSI.
9'x42'6" chrome lined, 150 PSI.
6'x37'2" chrome lined, 200 PSI.

DIESELS—(3) 2160 KW Busch-Sulzer, 3/60/2400/4160 Gen., complete. New 1943. Can be seen in operation.

HEAT EXCHANGER—1530 sq. ft. Admiralty tubes.

PRESSURE TANKS—(2) 10'x40', 30 PSI.
(2) 7'x45' 13,000 gal. vert., 60 PSI.
(1) 7'x24' 7000 gal. vert., 150 PSI.
(4) 7'x22'6" 6500 gal. vert., 100 PSI.

PROPANE TANKS—(4) 30,000 gal. 200 PSI, New.

Heat & Power Co., Inc.
310 Thompson Bldg., Tulsa 3, Okla.—Phone: 3-4890
70 Pine St., New York 5, N. Y.—HAnover 2-4890

FOR SALE EQUIPMENT

FOR SALE at Buffalo, Oklahoma: 2,200' of 9⅝" 36# J-55 Seamless Casing, once run. $2.50 per foot. Deep Rock Oil Corp.—Huitt—Ph. 2-4351—Tulsa.

DESULFURIZER

One 0.1 MM B. S. & B. skid-mounted desulfurizer capable of sweetening 100,000 cu. ft. of gas per day. Used short time. Located in West Texas. Contact Helmerich & Payne, F. F. Agee, 1st National Bank Bldg., phone 3-5104, Tulsa, or A. G. Post, Helmerich & Payne, McCamey, Tex.

FOR SALE—Horizontal Duplex Steam Pumps—10x8½x12—353 GPM—bronze fitted—max. discharge pressure 100 lbs.—6" suction—5" discharge—mfg. by American Marsh Co. Quantity available—NEW—Boston Metals Co. 313 E. Baltimore St., Baltimore 2, Md., Curtis 7-5050.

FOR SALE: Good used Pin & Pin Sucker Rods. A-1 Condition. 40,000'—¾" H&G Couplings. 20,000'—⅞" H&G Couplings. 30,000'—1" H&G Couplings. Prices on Application. Phone—wire—write, Sabine Pipe & Supply Company, P. O. Box 111, Kilgore, Texas. Phones 3094, 3095, 5533.

FOR SALE—55,000' Used Line Pipe. 45,000' 4" Thin Wall, Balance 3" & 4" Std. Line Pipe. 20,000' in Yard, Balance in Ground 9" to 12" easily accessible. Purchaser to Recover. Write T. R. Powell, Onyx Ref. Co., Box 330, Abilene, Texas or Call 4-6215.

SWEET GASOLINE PLANT—Forty Million daily at 350#. Dwellings and 17 acres of land. Contact E. W. Poindexter, Columbian Carbon Company, 704 San Jacinto Bldg., Houston 2, Texas. Phone CE. 8645.

FOR SALE—We have approximately 350,000' of 2" and 3" buried oil and water lines in the El Dorado, Kansas oil fields available for take-up on percentage basis. Depth 12-18". We would sell in ground. Full details by contacting Patridge, Cities Service Oil Company, Bartlesville.

FOR SALE: ENGINE—165 Hp. Climax Model R8i, maximum continuous Hp. rating 126. Herndon Drilling Company, 421 Mayo Building, Tulsa. Phone 4-9709.

USED HYDRAULIC DRILLS and Mayhew Model 1000—Gardner-Denver Pumps. Drills mounted on Fords and Internationals. Good condition. Price range from $3500.00 to $5500.00. 3820 N.W. 30th Street, Oklahoma City, Oklahoma. Phone Windsor 2-8597.

NEW DE LAVAL I.M.O. Pumps complete with 220-440 volt, 3 phase, 60 cycle, Westinghouse totally enclosed motors, Waldron couplings and base plates. The pumps range from 38 G.P.M. to 190 G.P.M., with discharge pressures ranging from 17 lbs. to 135 lbs. The motors are rated from 2 H.P. to 25 H.P. and from 1150 R.P.M. to 1750 R.P.M. This equipment is brand new and has been carefully protected. Kindly contact the Standard Oil Co. (Ohio), 16th floor, Midland Bldg., Cleveland, Ohio, Attn.: Mr. R. L. Charles.

THREE #12 Sweetland Filters, 48 bronze leaves, monel covered on 3" C.C., now located in southwest, available for inspection. 11 Sperry 18" x 18" cast iron Filter presses, 11 chambers. Consolidated Products Co. Inc. #65 Garden Street, Hoboken, N. J. N. Y. Tel.: BArclay 7-0600.

COMPLETE 5,000 bbl. per day pump jack; 1,400 ft. 3 in. tubing and rods, and two 100 bbl. tanks with 8 by 15 gun barrel. Used 30 days. Call 2-9923, Tulsa.

1 MODEL 37 Joy Mfg. drill with Failing automatic pull down, 4½ x 6 Gardner-Denver pump, 30 ft. mast, mounted on Ford truck, comolete with water truck. Also 1 model 200 RTA Joy drill mounted on Ford truck. Ainsworth, Inc., 1002 Union Nat'l. Bank Bldg., Wichita 2, Kans. Forest 3-3785, Murray 6-6823, Murray 2-3842.

FOR SALE: 4600 ft. good 3½" modified drill pipe. Take all, 80c ft. Will trade for 5½" casing. F. H. Graves, Box 583, Ardmore, Oklahoma. Phone 6337.

N-3 BREWSTER Double Drum Drawworks with one WAK Waukesha engine—Excellent condition, $7,500.00. Box H-617, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—At Oklahoma City: 8—200 HP Bessemer type 10 gas engine compressor units equipped with 17" x 20" Bessemer or Baash-Ross overhead exhaust power cylinders and 7" or 8" x 20" high and 14" x 20" low compressor cylinders. Contact T. P. Mace, Oklahoma City Warehouse or Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2803, Tulsa, Okla. $5.00 cash.

WANTED: Graduate Engineer by independent oil company. Experience in drilling completion, and workovers in the Illinois Basin. Give details of experience and salary expected. Box H-630, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

PETROLEUM GEOLOGIST under 30, with some Illinois Basin experience, to join geological staff of small, expanding, well established independent producing company. Work primarily in Illinois Basin. State age, required starting salary, education, previous experience, and references. Box H-605, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER with Masters Degree, or Doctor's in Chemical, Mechanical, or Petroleum Engineering, for research and teaching in Reservoir Mechanics and related fields at rapidly growing Southwestern institution. Rank and salary open. twelve months employment possible, consulting work encouraged and available in immediate area. Applications will be kept confidential. Box H-570, The Oil and Gas Journal, Tulsa, Oklahoma.

PROJECT ENGINEER

A large midwestern engineering and construction firm has a staff position for a qualified Engineer experienced in the petroleum and chemical industries.

This man must be capable of taking complete charge of a job; supervise engineering layouts and design, select plant equipment, coordinate purchasing and construction and maintain amiable relations with our clients.

In applying furnish a detailed resume of your education, experience and references. Address

BOX H-648,
THE OIL AND GAS JOURNAL,
TULSA, OKLAHOMA.

WANTED

A PROCESS SUPERINTENDENT
AND
A CHIEF MECHANICAL INSPECTOR

For Two Years Extendable Contract Employment in Baghdad, Iraq, Government Oil Refinery

TAX FREE LIBERAL SALARY WITH FURNISHED MODERN HOUSE

We are seeking men to handle these two important positions:

PROCESS SUPERINTENDENT

Will be in direct charge of operations of a combination crude distillation unit with vis breaking and thermo gas oil cracking. Also gasoline and kerosene treating facilities using caustic and copper chloride process. Must be thoroughly acquainted with topping and cracking operations. Chemical Engineer or equivalent. Must have experience as Process Superintendent or Assistant.

CHIEF MECHANICAL INSPECTOR

Must be capable of establishing oil refinery inspection department. Should be completely familiar with modern inspection methods and equipment. Mechanical Engineer or equivalent. Must have experience as a Refinery Equipment Inspector.

Successful candidates who can pass physical examination will be offered contracts embodying tax free liberal salary with furnished modern house including utilities, first class air transportation for self and family to Baghdad and return, medical care, accident insurance and annual thirty day vacation.

THESE ARE INTERESTING OPPORTUNITIES IN A COMPLETELY NEW MODERN REFINERY.

Qualified applicants should send complete personal and vocational history, compensation received and reasons for changing employment. Also please provide references and any other information you deem pertinent.

Apply by letter to

GENERAL REFINERY MANAGER,
P. O. Box 1513, Chicago 90, Illinois.

HELP WANTED

ENGINEERS, Executives, Technical Men Salaried positions—$6,000 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates 434 Frick Bldg., Pittsburgh 19, Pa.

GEOLOGISTS

Attractive staff positions are available with affiliates of Standard Oil Company (New Jersey) in South America and elsewhere. Five - ten years experience required, including several years experience as surface party chief. Assignments will include general regional studies. Positions also available for surface party chiefs for reconnaissance assignments on world-wide basis.

Attractive salaries, liberal annuity and savings programs offered.

Write, giving age, marital status, education and experience in detail

Box 308-E,

RADIO CITY STATION,

New York 19, N. Y.

REFINERY ENGINEERS
needed in
SOUTH AMERICA

Attractive staff positions are available with affiliates of Standard Oil Company (N.J.) for qualified experienced technical graduates.

MECHANICAL ENGINEERS—Must be thoroughly qualified and experienced design and/or maintenance of refinery or chemical plant equipment including piping, pressure vessels, heat exchangers.

CHEMICAL ENGINEERS and/or CHEMISTS—Assignments in process engineering will include economic studies and preparation of refinery operating programs. CHEMISTS will investigate problems of developing new products and processing methods.

Attractive salaries, liberal annuity and savings program offered.

Write, giving age, marital status, education and details of previous experience.

Box 308-F,

RADIO CITY STATION,

New York 19, N. Y.

CHEMICAL ENGINEER

UNUSUAL OPENING

Exceptional opportunity with small well established engineering firm for young chemical engineer—preferably major company or equivalent experience. Good educational background and 3 years or more experience with modern refinery processing and design, especially catalytic cracking and general refinery economics. Activities very diversified in desirable U.S. location. Some but not continuous traveling.

This position offers outstanding opportunity for ambitious and resoureeful engineer who can take responsibility for many diverse activities in petroleum refining and chemical fields. Salary commensurate with ability.

Box H-632,

The Oil and Gas Journal,

Tulsa, Oklahoma

HELP WANTED

PETROLEUM ENGINEERS wanted by growing independent producing company in West Texas area. Must have petroleum engineering degree and from two to five years of practical experience in drilling and or production work. Salary will be commensurate with experience. Reply should describe education, experience, marital status, and salary required. Recent photo will be helpful. Interview will be arranged if qualifications meet requirements. All replies will be treated in confidence. Box H-625, The Oil and Gas Journal, Tulsa Oklahoma.

WANTED
Experienced Petroleum Engineer

Specializing in study of OIL AND GAS RESERVES. Large independent oil company located in Tulsa, Oklahoma. In writing give full particulars as to personal history, academic qualifications, practical experience, references, and salary expected. All communications confidential.

BOX H-637,
THE OIL AND GAS JOURNAL,
TULSA, OKLAHOMA.

PLANT MANAGER

Large Mid-West Independent wants experienced man to manage operations of their Asphalt Refinery located in the Chicago area. Must have a record of successful experience in the Refining and handling of Asphalts. Salary open. Excellent opportunity for right man. Reply to

BOX H-638,

THE OIL AND GAS JOURNAL,
TULSA, OKLAHOMA.

CHEMICAL ENGINEERS
PETROLEUM ENGINEERS
CHEMISTS
(Colloid, Physical, Inorganic)

Expanding progressive oil well servicing organization has openings for the above engineering classifications in a new research group. Nature of duties will include the conceiving and developing of methods for stimulating the production of oil and gas wells. In addition, develop products, equipment and techniques which can be used to accomplish the above and/or reduce the cost of servicing wells.

Minimum Requirements: PhD and 2 to 5 years research or oil field experience.

Salary commensurate with experience and ability.

THE WESTERN CO.
Employee Relations Department

P. O. Box 310
Midland, Texas

HELP WANTED

IMMEDIATE OPENING for process engineer with experience in operation and design of petroleum refining equipment. Refinery located in southwest. TCC catalytic cracking experience desirable. Write giving resume of experience, availability and salary desired. Box H-628, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER: For Independent Refinery. Platformer, Refinery Yield Control, and research experience would be helpful. Write fully experience, education and starting salary. Replies confidential. Location Southwest. Box H-639, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED EMPLOYEES, for all positions on seismograph field crews, wanted by aggressive, expanding geophysical company. Please give full details of education, experience, salary expected, in first letter. Box H-566, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—SALES ENGINEERS

Two men with Engineering degree, or equivalent, who are interested in entering the sales field. No specific sales experience required. Real opportunity, age to 35. Leading petroleum industry manufacturer, outstanding employee benefit program. Box H-641, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEER: Independent Refiner in Midwest has opportunity for young engineer with experience in operations. Write fully advising whether catalytic, thermal, vacuum, platformer, asphalt, design, control, or whatever experience. State salary. Confidential. Excellent future. Box H-640, The Oil and Gas Journal, Tulsa, Oklahoma.

PROJECT ENGINEERS

For positions with Laboratory of major oil company to conduct research and development on drilling, production, and pipe line problems. B.S. or M.S. required. Experience on mechanical or hydraulic equipment and/or control and instrumentation for same desirable. Several needed. Salary open.

Box H-634, The Oil and Gas Journal, Tulsa, Oklahoma

RESEARCH CHEMIST

Rapidly growing, firmly established sales organization in the Southwest has ideal opportunity for person desiring participation in original research. Require MS in Chemical Engineering with minor in organic chemistry. Experience not necessary. Age 22-30.

Applicant must have demonstrated creative ability and capacity for independent research. Work will be with a senior research chemist. Duties will involve synthesis of organic compounds for petroleum production applications and periodic technical assistance of an organic chemical nature.

Please write giving personal background, draft or reserve status, salary desired and qualifications to:

BOX H-633,
THE OIL AND GAS JOURNAL,
TULSA, OKLAHOMA

OPERATING ENGINEER
NEW YORK OFFICE

To assist in supervising office & field and domestic & foreign activities of the Operating Department.

Challenging opportunity for graduate chemical or mechanical engineer with minimum five years petroleum refining experience, preferably with contracting engineering firm.

Please airmail confidential verifiable chronological resume, including salary history, to

PERSONNEL DEPARTMENT

HYDROCARBON RESEARCH, INC.

115 Broadway New York 6, N. Y.

HELP WANTED

PETROLEUM ENGINEERS, Drilling Engineers, Production and Reservoir Engineers. Positions open in Arabia. Require suitable educational background and minimum of five years experience. One year contract. No family quarters. Excellent salary and benefits. Apply in writing, furnishing full description of experience and qualifications to: American Independent Oil Co., 111 Sutter Street, San Francisco.

OIL AND GAS AUDITOR: New York office needs qualified and experienced auditor for traveling job. Box H-629, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS—Want young engineers with up to four years experience in drilling, production or reservoir work for immediate employment in Rocky Mountain Area. Salary commensurate with experience and training. Box H-603, The Oil and Gas Journal, Tulsa, Oklahoma.

COLLOID, PHYSICAL, INORGANIC

CHEMISTS

CHEMICAL ENGINEERS

PETROLEUM ENGINEERS

Aggressive oil well servicing company has openings for the above classifications for work in research and development testing of new hydraulic fracturing techniques, and other oil and gas well stimulation methods.

Advanced degree and oil field experience helpful but not essential.

Salary commensurate with training and experience.

THE WESTERN COMPANY

Employee Relations Department

P. O. Box 310

Midland, Texas

SITUATIONS WANTED

LANDMAN-ATTORNEY, well qualified, widely experienced. Desires change for more opportunity. Box H-620, The Oil and Gas Journal, Tulsa, Oklahoma.

FOREIGN EMPLOYMENT: Presently employed as District Superintendent in Venezuela supervising 300 employees in Drilling, Production, Refinery, Gasoline Plant, Recycling Plant. Complete knowledge of labor and petroleum laws. Graduate Petroleum Engineer. Desire change to Independent or Progressive Company bidding on concessions. Available on short notice. Please write Box 983, Freeport, Texas.

CHE., 41, Refining engineering operation and management. 17 years experience oil refining units. Box H-624, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFICE MANAGER: Thirteen years with major, last six foreign, Teaching and Engineering backgrounds. Seeking advancement. Married, thirty-seven, can travel, speak Spanish. Best references. Reply Box H-626, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST with six years experience, surface, subsurface, drilling, supervisory, consulting, desires employment with independent oil Co. Box H-578, The Oil and Gas Journal, Tulsa, Oklahoma.

REVIEW SEISMOLOGIST: Over ten years computing and interpretation experience Mid-Continent, Rocky Mountains, California offshore, and foreign review. Thirty-three, married. Seeks staff position or consulting affiliation. Details upon request. Box H-646, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST—8 years seis experience, Texas, Oklahoma, desires position with active company or independent. Box H-645, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY MANAGER, superintendent or administrative assistant. Experienced catalytic cracking, economics, planning, product control, etc. Excellent background. Degree. Employed. Box H-644, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

PETROLEUM ENGINEER, Graduate, 29, married, 4 years experience Secondary Recovery in Kansas, Oklahoma. Box H-636, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

ROYALTY COMPANY for sale: With or without Production. Contact A. S. Berry, 817 Wright Bldg., Tulsa, Okla.

JACK EAGLE, Oil Properties, 706 City Nat'l. Bldg., Oklahoma City, Oklahoma. Telephone REgent 6-7027.

LEASE AND DRILLING BLOCKS

HAVE 40 ACRE Federal oil and gas lease. Section 17 T35S, R-17E, SLM, San Juan County, Utah. Interested parties write to: M. V. Mack—Glenhaven Apts. 43C, Greenwood, S. C.

HAVE DRILLING locations in old-new production E. Kansas Boom Area. Box H-647, The Oil and Gas Journal, Tulsa, Oklahoma.

SEE A. L. BOWLES, Box 947, Ada, Okla., for drilling deals and producing royalties if you have the cash for Oil Investments.

FOR SALE: Oil producing property in Elliott County, Kentucky. Nine new pumping wells producing from the Weir sand at 1,100 feet. 550 acres under lease only partially developed. No dry holes drilled on these leases, excellent opportunity for further development. Asking $160,000. Write E. A. Woltz, 219 New York Ave., Des Moines, Ia.

Will pay cash instantly for lease (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

560 A. BLACK HILLS AREA

Has over 3 M. tons of Bentonite. Prospects good for Uranium, oil and gas. Sell 87½% rights for $100 per A. 20% cash. Bal. 4 yrs. 5%. Box H-642, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis, Mo.

BUSINESS OPPORTUNITIES

WESTERN CANADA—Manufacturers Representative—Graduate mechanical engineer—desires accounts for sale to oil, gas, industries; refineries, pipelines. Excellent contacts. Box H-643, The Oil and Gas Journal, Tulsa, Oklahoma.

ORGANIZED GROUP of business men financially able to undertake uranium deals of unlimited size, operations, buying claims, active exploration, etc. You are dealing directly with us. Reasonable inquiries will receive prompt attention. Box H-567, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW OIL COMPANY buying proven oil and gas production with incomes ranging from $25,000.00 to $300,000.00 per month. You are writing directly to company officials. Financial statement will be presented to reliable sellers, principals, and authorized brokers. Box H-586, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL PRODUCTION NEGOTIATED. Mr. Oil Producer perhaps you like to consider disposing of your PRODUCTION COMPANY or your DEVELOPED OIL PROPERTIES to take advantage of Capital gain and devote further development and attention to your undeveloped holdings. In strict confidence write PERCY E. A. CONVERSE, Pawnee Rock, Kansas.

PRODUCING O & G FIELDS
SOUTHEAST NEW MEXICO

Opportunities for high income return with reserve factor of 8.6 to 1 is offered large & small investors, in proven drilling areas. Data on request.

W. J. Peterman, Geologist
1918-1955
Portales, New Mexico

REAL ESTATE

AMBASSADOR HOTEL, Palm Springs, Calif. Property you'd be proud to own, and a tax saver.

OIL PROSPECTOR

AMAZING instructive geophysical literature free on request to oil prospectors and land owners. Write SURFACE OIL SURVEYS, 1414 Electric Bldg., Fort Worth, Texas.

BUSINESS SERVICE

Delaware Corporations formed and serviced. American Guaranty & Trust Company, P. O. Box 487, Wilmington, Delaware.

WANTED

SETTLED OIL production wanted by independent operator direct from producer. P. O. Box 852, Oklahoma City, Oklahoma.

BUSINESS COST Reduction and Revenue Increasing Expert Solicits foreign business basis small share of Increased Profits; fixed fee, or salary. Box H-619, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—IDEAS

Inventions that are related or can be adapted to the oil industry. We offer capital, technical advice, patent assistance, market research, a manufacturing plant, and a sales outlet; everything to put your invention on the market. Write P. O. Box 1665, Houston 1, Texas.

PETROLEUM AND Natural Gas Engineer, practicing consulting engineering in all phases oil and gas business including writing engineering and reserve reports desires clients on fee or retainer basis. Box 9678, Dallas, Texas.

MAP STICKS

ELIMINATE YOUR MAP-HANDLING PROBLEMS! Simply roll your maps on Kraftbilt All-Plastic Snap-On Map Sticks and hold in place with light-weight resilient plastic clips. Bright colored Index Flags plug in one end of each stick, carry labeled identity and instantly "flag" the map you want. Send for new Catalog 1054-B. Ross-Martin Co., P. O. Box 800-A, Tulsa 1, Oklahoma.

MAP WEIGHTS

JUST LIKE AN EXTRA PAIR OF HANDS. Kraftbilt 20-ounce cream-colored horsehide weights hug drawings or maps to the table while you work. Hand-sewn with heavy duty stitching, they're shot-filled and round in shape for ease of use and long life. Ask for Catalog 1054-B. Ross-Martin Co., P. O. Box 800-A, Tulsa 1, Oklahoma.

Stearns-Roger Establishes Canadian Subsidiary

Charles O. Voigt, president of Stearns-Roger Manufacturing Co., Denver, has announced the establishment of a subsidiary company in Canada, known as Stearns-Roger Engineering Co., Ltd. The headquarters are at Calgary, Alta., where Robert T. Helmer, managing director, is in charge of the new company.

Prior to becoming associated with Stearns-Roger, Helmer was vice president and managing director of Franco Oil, Ltd., with headquarters in Vermillion, Alta., and at one time district manager for Hughes Tool Co.

The new organization is wholly owned by the parent company and will carry on its usual activities of process engineering, general engineering, fabrication, and field election.

Stearns-Roger Manufacturing Co. was founded in 1885 with headquarters in Denver.

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Successful Wildcats

(Continued from page 213)

28-10n-11e. IPF 165 BOPD, ¼-in., 39.3°, Massive sand of Tuscaloosa 9,101-10 ft. TD 9,118 ft. (Oil discovery of Locust Ridge field.)

OKLAHOMA

Garvin County: Sinclair Oil & Gas Co. 1 Morgan, C NW NW 29-4n-4w. IPF 127 BOPD, 112 M.c.f. of gas per day, Hart sand 9,059-9,129 ft., 39°, ¼-in. TD 10,559 ft. (Oil discovery.)

Haskell County: Superior Oil Co. 1 Gordon, 1¾ miles southeast of East Lona field, NW NW SE 16-8n-20e. IP 4,070 M.c.f. of gas Cromwell 5,567-82 ft.; 4,735 M.c.f. of gas from Atoka 5,955-69 ft., ¾-in. TD 6,077 ft. (Gas discovery.)

Noble County: LaGorce Oil Co. 1 Sanders, 1¾ miles east of Northwest Perry field, NE SE NW 3-21n-1w. IPP 10 BOPD, Sams sand 1,630-39 ft., 39°. TD 3,984 ft. (Oil discovery.)

KANSAS

Barber County: GMR-Lion Oil Co. 1 Moffett, NE NE SE 9-30s-15w. IP 12,400 M.c.f. of gas per day, 4,571-84 ft. Penn. sand. TD 4,838 ft. (Gas discovery.)

Barton County: Rocket Drilling Co. 1 McDonald, SE SW NE 34-20s-13w, 1 mile from production. IPP 50 BOPD, Lansing 3,266-3,340 ft. TD 3,592 ft. (Opens Southeast Sandrock.)

Hamilton County: United Producing Co. 1 Helfrich, C SE SE 6-25s-42w. 21 miles northwest of Hugoton field. IPP 50 BOPD, Cherokee 5,040-50 ft. TD 5,640 ft. (Oil discovery, first oil in county, rank wildcat.)

CALIFORNIA SUCCESSFUL WILDCAT

Fresno County: Los Nietos Co., Oper, 55-1 Bourdieu, NW SE 1-21s-16e. IPF 2,927 BOPD rate on 11-hour test, 1-in. choke, 32.2° gravity, 3,550 M.c.f. gas, perfs. 10,630-10,737 ft., TD 10,737 ft. (New Gatchell, Eocene, field 2 miles southeast of Guijarral Hills field.)

COLORADO

Logan County: Shell Oil Co. 1 Alex Fiebig, NW SW NW 25-7n-53w. IPP 53 BOPD, Muddy discovery, new field. TD 4,598 ft. Dakota.

SASKATCHEWAN

Socony-Woodley-Southern 28-6 Battrum, LSD 6, 28-18-17w3, Roseray oil well. TD 3,141 ft.

ALBERTA

Socony-CPR 10-11 East Chancellor, LSD 11, 10-25-20w4. Basal Blairmore gas well. TD 4,870 ft.

Socony-CPR 3-6 Hussar, LSD 6, 3-24-20w4. Basal Blairmore gas well. TD 4,822 ft.

Sinclair-Banff 1 Buffalo Lake Crown, LSD 7, 26-74-8w6. Triassic oil well. TD 9,010 ft.

Los Nietos 6-36 West Alder Flats, LSD 6, 36-45-9w5. Indicated Cardium strike. TD 5,788 ft.

BRITISH COLUMBIA

NFA-Texaco 1 Boundary Lake, LSD 6, 6-86-13w6. Triassic oil well. TD 8,060 ft.

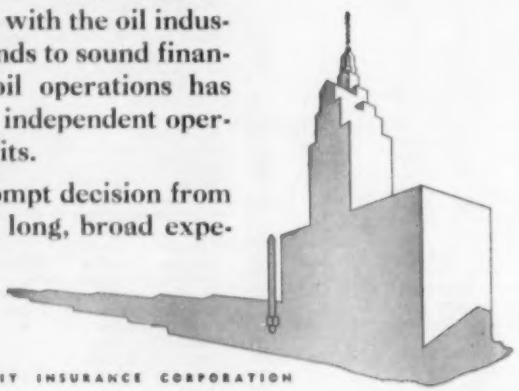
NATIONAL BANK OF TULSA
NBT

BANK of TULSA

The Oil Bank of America

The reputation of National Bank of Tulsa as "The Oil Bank of America" has been built on many years of close cooperation with the oil industry. The application of NBT funds to sound financial requirements of proven oil operations has helped many oil companies and independent operators to greater success and profits.

You can depend upon a prompt decision from NBT officials who have had a long, broad experience in oil financing.

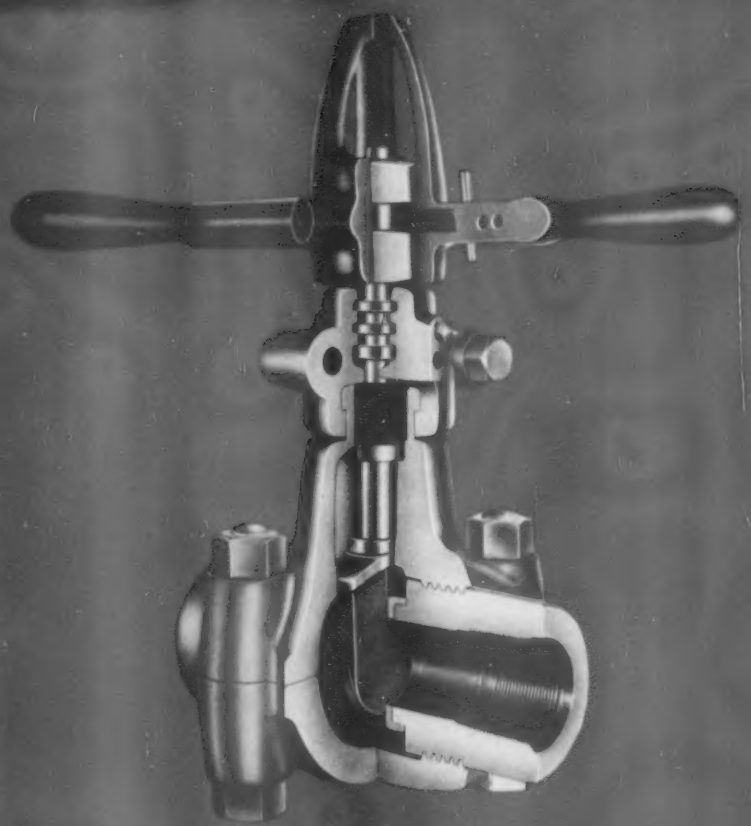


MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

NATIONAL BANK OF TULSA

The Oil Bank of America

OFFERING COMPLETE BANKING AND TRUST SERVICES

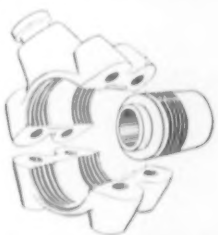


Cameron

FLEX-SEAL VALVES SAVE TIME AND MONEY WITH THESE EXCLUSIVE FLEX-SEAL FEATURES...

Faster rigging up . . . faster rigging down . . . easy, inexpensive repairs in the rig with ordinary rig tools . . . low-cost replacement parts, even to the two-piece body . . . these are some of the Flex-Seal features that have made a host of friends for Cameron among drillers and rig owners throughout the oil world. Add to this the fact that Flex-Seals operate easily and seal tightly . . . even after long service . . . and you have the reason for the outstanding success of this fine valve.

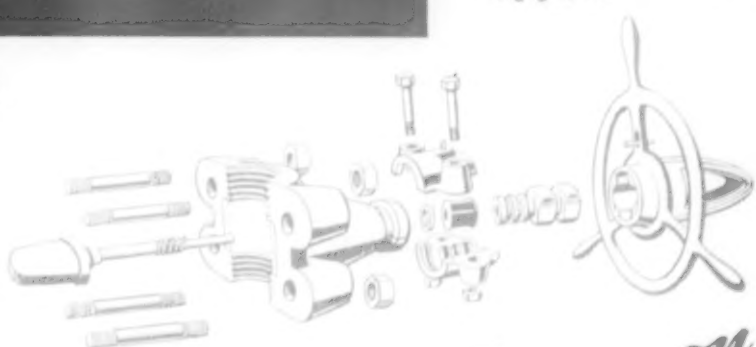
FLEX-SEAL is the only mud valve that serves as a union. The hubs are attached to the body by interlocking shoulders and grooves. This exclusive feature permits swiveling, saves rigging-up time and the cost of line unions.



FLEX-SEAL design assures low-cost maintenance. The body, for example, is in two pieces with the hubs separate. Should the valve become sand cut, it can be restored to its original condition by replacing an inexpensive part . . . not an entire body. The design is so simple that any member of the drilling crew can overhaul it completely with regular rig tools.

This shoulder on the Flex-Seal gate contacts the top of the gate packer when in the closed position, thus preventing "flowing" of the resilient packer and prolonging its life.

The remarkable FLEX-SEAL one-piece resilient insert provides a super-tight seal for the gate, absorbs cutting action and is readily replaceable.



FLEX-SEAL Valves have a lot of parts and there's a good reason for it. Each individual part is replaceable at a minimum of expense. The replacement of small, inexpensive parts and the elimination of costly delays, transportation, and valve repair shop charges, has found favor with cost-conscious operators the world over.

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